

*“This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 653605”*

**Innovative Climate-Control System to Extend Range of Electric Vehicles and Improve Comfort (XERIC)**

H2020 - GV - 2014 / GV - 2 - 2014 (RIA)

RIA n° 653605

Start Date: **1<sup>st</sup> June 2015** - Duration: **36 months**

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# Deliverable

## Report:

### D5.11\_WP5\_EMH

## Report about 2<sup>nd</sup> Workshop

### Public

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**Deliverable No.:** 5.11

**Issue Date:** 15.06.2017

**Number of pages:** 18

**Identifier:** D5.11\_WP5\_EMH

#### Summary:

According to XERIC’s Grant agreement/Annex1 3 public workshops are to be organized throughout the project’s lifetime. Following the first event organized on November 24, 2016 in Italy, the 2<sup>nd</sup> workshop of the project was organized on April 11-12, 2017 in the frame of EVER Monaco 2017.

With regard to its scope and location, the event **Ecological Vehicles and Renewable Energies** was chosen by XERIC’s consortium as an ideal place to share its latest results and increase networking capacities in an international scenario.

As it was done in occasion of the first workshop, clustering activities with two other H2020 EV projects (JOSPEL and OPTEMUS) were promoted.

This deliverable details the organization, the program, the budget and the communication activities implemented for the XERIC’s 2nd workshop. With an open round table, a Special Lecture Session which included 13 oral presentations (about 30 attendees each) and an exhibition stand, the event has been a success and a good occasion to capitalize and disseminate XERIC’s results through the IEEE (Institute of Electrical and Electronics Engineers) Xplore Data Base.

XERIC’s members have received from EVER2017 scientific committee the following two awards:

- the Best Paper on Ecological Vehicles,
- the Best Special Session Award.

The cost of the event (XERIC’s workshop) was about Euro 10.000.

## Document history and validation

When	Who	Type	Comments
08/06/2017	Mathilde Boucher (EMH)	Version 1	
14/06/2017	Lucie Vaamonde & Gilbert M. Rios (EMH)	Version 2	
15/06/2017	Nino Gaeta (GVS)	Version 3	

<b>Author(s):</b>	Mathilde BOUCHER, Lucie Vaamonde, Gilbert M. Rios, EMH	Approved by the Coordinator : Yes  Date: 15/06/2017
<b>Reviewer(s):</b>	Nino Gaeta, GVS	

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## 1. Context and Purpose

### 1.1. A second workshop with clustering activities

According to XERIC's Grant Agreement/Annex 1, 3 public workshops are to be organized throughout the project's lifetime. Organizing events falls within WP5. The European Membrane House (EMH) is the leader of WP5.

The first event - titled "**Improving Energy Efficiency in Electric Vehicles**", with subtitle "*Insights on H2020 Initiatives on Energy Management*"- was organized on November 24, 2016 in Bologna, Italy. As already done during its first workshop, XERIC promoted clustering activities and invited for its 2<sup>nd</sup> workshop two other European projects: [JOSPEL](#) and [OPTEMUS](#) (also financed under the Green Vehicle call GV.2 – 2014 "Optimized energy management in electric vehicles"). JOSPEL and OPTEMUS are also focused on air conditioning and thermal management systems for electric vehicles. Indeed, the three projects take up together the challenge of improving the operating range of electric vehicles.

EMH kept the lead for supervising the event's organization and ensuring joint communication actions to promote the event.

### 1.2. A selected framework: EVER Monaco 2017

Since his accession, His Serene Highness Prince Albert II of Monaco has spurred the Principality into a sustainable development policy, in particular in relation to "clean" mobility and is targeting carbon neutrality by the middle of the century. The partnerships signed with car manufacturers, together with the commitment of various administrations and public utility companies, have resulted in Monaco becoming a true showcase for clean mobility.

EVER Monaco features scientific lectures, round tables sessions and international meetings on **E**cological **V**ehicles and **R**enewable **E**nergies. The goal of this event is to increase awareness about the development of renewable energies and improved energy efficiency.



EVER Monaco 2017, organized **from the 11th to the 13d of April**, has been the 12d edition of the event.

With regard to its scope and location, EVER Monaco was chosen by XERIC's consortium as an ideal place for the 2<sup>nd</sup> workshop of the project. EMH worked in close collaboration with the program committee (in particular with Professor Ahmed MASMOUDI, chairman of the Scientific Conference) to organize the workshop in the frame of this big event.

### 1.3. Workshop's purpose

The purpose of the second workshop was to serve as a tool for:

- Disseminating and sharing the latest results obtained by the XERIC's, OPTEMUS' and JOSPEL's projects;
- Increasing networking capacities within the context of an existing international event
- Discussing the European financing opportunities for electro-mobility

## 2. Program

The event included 3 main parallel activities:

1. Round table sessions organized during the first day involved experts in ecological vehicles and renewable energies, thus providing an opportunity to compare and share the experiences of all.
2. The Special Lecture Session on New Progress in Air Conditioning and Thermal Management Systems for Electric Vehicles brought together researchers, academics and industrialists in charge of development projects to discuss this topic.
3. An exhibition to which XERIC participated with a stand held by EMH during the three days of EVER Monaco 2017 to create occasions for people to meet and discuss around the three European projects developed within the framework of INEA: XERIC, JOSPEL and OPTEMUS.

These activities are detailed hereafter.

### 2.1. Open round table for a broad audience

Round tables open to all participants and visitors of EVER Monaco were organized during the mornings of the two first days. Two main subjects were respectively approached: “Smart transport sector of tomorrow” and “Energy transition & renewable energies”.

Nino GAETA, XERIC’s coordinator, took the opportunity to present the project during the first day, in front of approximately 30 people (*Illustration 1*). He took part in the “mobility and energy perspectives” discussion at the end of the morning, sitting with the Director of Clean Energy Planet, the development manager of CarPostal and a representative of the Goodyear Company.



*Illustration 1: Nino GAETA presenting the XERIC project during the round table*

In Appendix 1 *the transcript of some of parts of what was discussed is reported.*



## 2.2. Special Lecture Session during scientific conferences

The EVER Monaco conferences were launched in 2007 with the aim of involving academia and industry. The participants, who come from all over the world, present and discuss their latest research results during oral and poster sessions.

Prof. Gilbert RIOS (EMH) in collaboration with Prof. Ahmed MASMOUDI (chairman of the program Committee) organized a special lecture session based on presentations of XERIC, OPTEMUS and JOSPEL projects titled “New Progress in Air Conditioning and Thermal Management Systems for Electric Vehicles”. Researchers from the three projects (XERIC, JOSPEL and OPTEMUS) presented the results related to their projects on April 11 and on April 12.



*Illustration 2: Carlo Isetti presenting.*

More than one hundred participants of 27 nationalities attended the EVER scientific conference this year. The special lecture session organized by the XERIC project welcomed around 30 attendees each day.

*See the detailed program of the special lecture session in Appendix 2, with some notes taken by Stefano Lazzari (chairman of the session) to present the speakers.*

4 presentations were made by XERIC’s partners. Two of them are here illustrated (*Illustrations 2 and 3*).



*Illustration 3: Marta Bojarska presenting*

During the Official Dinner of EVER Monaco, XERIC’s members were twice awarded:

- Carlo ISETTI, Enrico NANNEI, Stefano LAZZARI, Bernardo CERRAI and Sergio NARI received the award of the best paper on ecological vehicles, for their paper entitled “New climate-control units for more energy-efficient electric vehicles: system architecture”.
- Pr. Gilbert A. RIOS, as EMH chief executive officer in charge of the organization of XERIC’s 2nd workshop, received the Best Special Session Award.

*See the awards presented in Appendix 3*

### 3. Budget

What	Cost
Conference Registration 2 EU Specific Sessions	5803,90 €
Communication and promotional material	773,56 €
Booth renting	3438,11 €
Total	10015,57 €

### 4. Communication

#### 4.1. Teaser

The event was announced in XERIC's 3d newsletter (December 2016):

**SAVE THE DATE: *New Progress in air conditioning systems for EVs***



Sessions devoted to "New progress in air conditioning systems for electric vehicles" are getting organised by the XERIC, JOSPEL and OPTEMUS European-funded projects. They should be part of the **EVER Conference** to be held in **April 2017** (11th to 13th) in Monaco.

Keep a keen eye on your email inbox: you will receive more information in January 2017.

#### 4.2. Exhibition stand and related communication activities

A XERIC's exhibition stand was set up in order to communicate on the main objectives of the project and put interested people in contact with researchers (*Illustration 4a*).

A poster was created to promote the XERIC project and link it with JOSPEL and OPTEMUS (see *Appendix 5*). It was used on the booth and also as a signage for the Special Lecture Session at Room Bosio (*Illustration 4b*).



Illustration 4b:  
Signage for the Special Lecture Session



Illustration 4a: XERIC's booth

An advertiser inviting people to visit our booth was published in the EVER Monaco booklet (see Appendix 6).

The first pages of some interviews of XERIC's team members were displayed on the wall to give human faces to the research work carried out and invite people to ask more about the team members. The full versions of the interviews were printed and available on the stand (also published online on XERIC's website: <http://xeric.eu/partners-presentation/interviews/>)

### 4.3. After the event: knowledge capitalization

The presented papers have been published in the [IEEE Xplore Digital Library](#), which is a powerful resource for discovery of scientific and technical content published by the IEEE (Institute of Electrical and Electronics Engineers) and its publishing partners. IEEE Xplore provides web access to more than four-million full-text documents from some of the world's most highly-cited publications in electrical engineering, computer science, and electronics.

The 4 papers presented by XERIC's members are now published in the IEEE Xplore Digital Library:

- “New climate-control units for more energy-efficient Electric Vehicles : the innovative three-fluids combined membrane contactor” (TICASS, UNIGE, Fraunhofer-ITWM)
- “How to design a proper membrane for a membrane contactor-based air conditioning system” (UDE, UNIGE, GVS)
- “New climate-control units for more energy-efficient electric vehicles: system architecture” (TICASS, UNIGE, Frigomar)
- “A pilot system for the characterization of hydrophobic membrane contactor modules to be used in air handling processes” (UNIGE)

See abstracts and related links to the repository in Appendix 4



## Appendices

### Appendix 1: Intervention during the round table – Monday April 11 Transcript of the presentation of the project and discussion

*(Nino GAETA, GVS, XERIC's coordinator)*

What do we do in actual vehicles, electric or not? We take the humidity from the air in the vehicle, we get it to the dew point (liquid) and take the water out. The cold air (4-5°C) is then warmed up before being returned to the cabin for passenger comfort (20-25°C). Anyway, you need energy to cool the air down to the dew point and energy to increase the temperature again.

We have a system basically based on membranes – membrane is one of our businesses in GVS – which take humidity out of the air independently from its temperature, by mass transfer. We can take the humidity out of the air at room temperature, like in this room at this time. So we save all that energy needed to get to the dew point, let's say from 20°C to 4°C, and to reheat it again. We control the humidity just by mass transfer and not by temperature. By doing so, if you make the calculation, we may save at least 30% of the energy in extreme conditions (like hot summer in South of France or in the most arid regions where you easily reach a temperature of 40°C and 80% humidity).

This is, in a nutshell, our concept. We have a membrane, which acts as a contactor between humid air and a desiccant solution. The desiccant solution takes the humidity out of the air: the membrane prevents the liquid from the solution to get into the air. You can control the dryness of the air, which is ready to be used inside the cabin. In some regions, where there is no need to cool down the air but just control its humidity, like in the North of Europe for example, that's also a good solution.

We have a booth up in the exhibition room, if you are interested in acquiring more detailed information. We are now in the middle of this project, based on an idea and first experiences that we started to develop since four or five years.”

*(Joseph BERETTA, Avere France, chairman)*

Just for my understanding, your system is reversible? Cooling and heating? But probably not with the same efficiency?

*(N. GAETA)*

We are developing it in a way that it can also be used in winter. By inverting the cycle, we can in winter give heat. But of course, the biggest saving is in summer conditions.

*(J. BERETTA)*

Do you have some contacts with car manufacturers? Or car suppliers?

*(N. GAETA)*

As a company, we know all the biggest OEM. Our customers are OEM like Bosch, Siemens, Denso... All the big OEM. Our customers are big companies with large volumes. We manufacture the membranes and the filters, so we know the market very well. In fact, statistically, one car out of three all over the world has at least one filter from GVS. So probably your car... [Laughs]

*(J. BERETTA)*

Thanks for your presentation. It's a very interesting concept to reduce the consumption of electric cars and to increase their autonomy.

## Appendix 2: Program of the Special Lecture Session With notes taken by Stefano Lazzari to present the speakers

Special Lecture Session on New Progress in Air Conditioning and Thermal Management Systems for Electric Vehicles (Part 1)

16H00 - 18H00, Room Bosio

CHAIRS: Stefano Lazzari (Italy), Oleg Iliev (Germany)

EVER17-163

### Financing Electro-Mobility Thanks to H2020



Lucie Vaamonde, EMH, on behalf of INEA

EVER17-164

### Battery Concept to Minimize the Climate-Related Reduction of Electric Vehicles Driving Range



Gero Mimberg and Christoph Massonet, ika RWTH Aachen University, Germany

EVER17-165

### Reducing the Energy Consumption for Comfort and Thermal Conditioning in EVs



Alois Steiner and Alexander Mladek, Virtual Vehicle Research Center, Austria

*Alois Steiner has a degree in Mechanical Engineering and Economics. He works on thermal management and mobile air conditioning. He is the coordinator of OPTEMUS.*

EVER17-166

### Real Time Energy Efficiency Optimization in Connected Electrical Vehicles



Juan Rico, Daniel Calvo, Juan Sancho, Miguel Rodriguez, Martin Wagner, Andrea Rossi, and Miguel Mateo, Atos Research and Innovation, Spain

*Juan Rico received a degree in Telecommunications Engineering in 2006 and a Master degree in Information Technology and Communication in Mobile Networks in 2009 from the University of Cantabria Spain. He is currently working in Atos Research and Innovation as project manager in the Energy Sector with more than 10 years of experience working in R&D projects from FP6, FP7 and H2020. In 2012 as Project Coordinator of SICRA project he was awarded by ESA (European Space Agency) in the Galileo Master Contest and in 2015 by Celtic Plus as coordinator of TILAS as best smart city project. He has also acted as expert for French ANR (Agence National Recherche) reviewing and evaluating R&D proposals. Currently his research interests are focused on IoT, Smart Grids, electric vehicles and Energy efficiency.*

EVER17-167



### **New Climate-Control Units for More Energy-Efficient Electric Vehicles: the Innovative Three-Fluids Combined Membrane Contactor**

Carlo Isetti and Enrico Nannei, Innovative Technologies for Environmental Control and Sustainable Development, Italy

Stefano Lazzari and Saeed Hariri, University of Genoa, Italy

Oleg Iliev and Torben Prill, Fraunhofer-ITWM, Germany

*Stefano Lazzari teaches HVAC systems and Applied Physics at the University of Genova (Italy), is an expert in the fields of CFD and energy savings in buildings heating/cooling, is the deputy coordinator of XERIC*

EVER17-168



### **How to Design a Proper Membrane for a Membrane Contactor-Based Air Conditioning System**

Marta Bojarska, Clemens Alexowsky, and Mathias Ulbricht, University of Duisbur-Essen, Germany

Stefano Lazzari and Aldo Bottino, University of Genoa, Italy

Claudia Cattaneo and Gustavo Capanelli, Innovative Technologies for Environmental Control and Sustainable Development, Italy

Soccorso Gaeta, GVS Filter Technology, Italy

## **Special Lecture Session on New Progress in Air Conditioning and Thermal Management Systems for Electric Vehicles (Part 2)**

10H30 - 12H50, Room Bosio

CHAIRS: Stefano Lazzari (Italy), Felix Weidmann (Germany)

EVER17-169



### **Low Energy Heating System Based on Joule Effect: JOSPEL Project**

Vanessa Gutiérrez Aragonés and Begoña Galindo Galiana, AIMPLAS Plastic Technology Centre, Spain

Carlos Bandrés Diéguez and Miguel de Dios Álvarez, CTAG Automotive Technology Centre of Galicia, Spain

Damián Calabuig and Alejandro Cabanes, Durplastic, Spain

*Vanessa Gutiérrez Aragonés is from AIMPLAS Plastic Technology Institute in Spain, has a degree in Material Engineer, and is specialized in formulating and compounding plastic materials for custom applications. Her main areas of expertise are use of nanofillers, natural fillers and weight reduction in technical plastics. She is the coordinator of JOSPEL.*

EVER17-170



### **New Climate-Control Units for More Energy-Efficient Electric Vehicles: System Architecture**

Carlo Isetti and Enrico Nannei, Innovative Technologies for Environmental Control and Sustainable Development, Italy

Stefano Lazzari University of Genoa, Italy

Bernardo Cerrai and Sergio Nari, Marine Refrigeration and Air Conditioning Systems, Italy

*Carlo Isetti has a degree in Chemistry, is Professor of HVAC systems and Applied Physics at the University of Genova (Italy), is father of the idea underneath XERIC project together with Prof. Nannei, is an expert in membrane contactors*

EVER17-171



### **Insulating Sandwich Housing Structures for the Thermal Management of Battery Packs**

Felix Weidmann, Fraunhofer Institute for Structural Durability and System Reliability, Germany

*Felix Weidmann studied mechanical engineering in TU Darmstadt, is expert of polymer composite processes; now he works at Fraunhofer Institute where his research field is polymer composites and phase change materials. He is lecturer of "fiber reinforced plastics" at the University Mosbach (Germany)*

EVER17-172



### **Efficient Cabin and Powertrain Preconditioning for EVs with a Water-to-Water Heat Pump System**

Andres Caldevilla, Markus Özbek, Werner Hünemörder, Tibor Györög, and Edouard Hougard, DENSO Automotive Deutschland GmbH, Germany

Marius Pinteau, PiNTeam GmbH, Germany

EVER17-173



### **Isothermal Calorimeter Heat Measurements of a 20Ah Lithium Iron Phosphate Battery Cell**

Luis Millet, Maximilian Bruch, Peter Raab, Stephan Lux, Dr. Matthias Vetter, Fraunhofer-Institut für Solare Energiesysteme ISE, Germany

*Maximilian Bruch holds a Diploma in Mechanical Engineering and a MSc. in Sustainable Energy Management and Technology. Since 2013 he has worked at the Fraunhofer Institute for Solar Energy Systems ISE in the Team Battery Engineering. His main tasks were the simulation of redox flow battery systems, the technical assessment of battery storage power stations, the development of advanced manufacturing techniques for lithium ion batteries and the experimental evaluation of commercial lithium ion batteries as well as self-made battery cells based on new chemistries. Currently he is project manager in the JOSPEL project and primarily responsible for the development of the EV battery system.*

EVER17-174

### **From Cell to System: Battery System Design**



Maximilian Bruch, Fraunhofer-Institut für Solare Energiesysteme ISE, Germany

EVER17-175



### **A Pilot System for the Characterization of Hydrophobic Membrane Contactor Modules to Be Used in Air Handling Processes**

Antonio Comite and Aldo Bottino, University of Genoa, Italy

Claudia Cattaneo, Federica Boero, Gustavo Capannelli, Osvaldo Conio, Carlo Isetti, and Enrico Nannei, Innovative Technologies for Environmental Control and Sustainable Development, Italy

*Antonio Comite has a degree in Industrial Chemistry, he works at the University of Genova (Italy), he is expert in membrane science and technology, fuel cells and catalysis.*



## Appendix 3: XERIC's Awards received during this 2<sup>nd</sup> workshop

**EXPOSITION & CONFERENCES INTERNATIONALES  
SUR LES ÉNERGIES RENOUVELABLES  
& LES VÉHICULES ÉCOLOGIQUES**

**EVER 2017**  
ECOLOGIC VEHICLES • RENEWABLE ENERGIES  
MONACO

GRIMALDI FORUM  
MONACO  
April 12, 2017

### Best Paper Award

This is to certify that:  
**Carlo Isetti and Enrico Nannei**, from the Innovative Technologies for Environmental Control and Sustainable Development, Italy  
**Stefano Lazzari**,  
from the University of Genoa, Italy  
**Bernardo Cerrai and Sergio Nari**,  
from the Marine Refrigeration and Air Conditioning Systems, Italy

have received the award of the best paper on ecological vehicles, for their paper entitled:  
**New Climate-Control Units for More Energy-Efficient Electric Vehicles:  
System Architecture**  
(EVER17-170)

This award has been remitted to them as recognition of their contribution to the success of EVER 2017.

H.E. Mr Bernard FAUTRIER  
EVER Chairman

**EXPOSITION & CONFERENCES INTERNATIONALES  
SUR LES ÉNERGIES RENOUVELABLES  
& LES VÉHICULES ÉCOLOGIQUES**

**EVER 2017**  
ECOLOGIC VEHICLES • RENEWABLE ENERGIES  
MONACO

GRIMALDI FORUM  
MONACO  
April 12, 2017

### Best Special Session Award

This is to certify that:  
**Professor Gilbert A. Rios**,  
from University of Montpellier, France

has organized the best special session on ecological vehicles, which is entitled:  
**New Progress in Air Conditioning and Thermal Management Systems  
for Electric Vehicles**  
(Lecture Sessions EV1, April 11, and EV2, April 12, 2017)

This award has been remitted to Professor Rios as recognition of his contribution to the success of EVER 2017.

H.E. Mr Bernard FAUTRIER  
EVER Chairman

## Appendix 4: XERIC's publications on the IEEE Xplore Database

- **New Climate-Control Units for More Energy-Efficient Electric Vehicles: the Innovative Three-Fluids Combined Membrane Contactor** – TICASS, UNIGE, Fraunhofer ITWM

### Abstract

This paper describes the work in progress in the XERIC project, funded within the Horizon 2020 EU program, that is aimed at building and testing a new climate-control system. The latter integrates a vapour compression cycle with a liquid desiccant cycle to increase Battery Electric Vehicles autonomy thanks to its increased energy efficiency. Modeling activity carried out on the design of an innovative Three-Fluids Combined Membrane Contactor (3F-CMC) and on the development of a lumped-parameters model to predict the 3F-CMC performance is described. The physical assumptions considered in the lumped-parameters model are presented. Results of 2D and 3D numerical heat and mass transfer simulations are used to get input data for the lumped code. The effect of air spacer geometry design on the overall component performance is presented.

Keywords: XERIC project; Three-Fluids Combined Membrane Contactors; hybrid AC systems, mobile air conditioning; liquid desiccant air handling.

DOI: 10.1109/EVER.2017.7935951

Repository link: <http://ieeexplore.ieee.org/document/7935951/>

- **How to Design a Proper Membrane for a Membrane Contactor-based Air Conditioning System** – UDE, UNIGE, GVS

### Abstract

This paper is dedicated to the development of proper membrane for membrane contactor-based air conditioning system. Based on mass transfer analysis and knowledge of membrane formation, guidelines for most appropriate membrane were made.

Keywords: gas liquid membrane contactor; air conditioning systems; air dehumidification; membrane formation.

DOI: 10.1109/EVER.2017.7935952

Repository link: <http://ieeexplore.ieee.org/document/7935952/>

- **New climate-control units for more energy-efficient electric vehicles: system architecture**

#### Abstract

The paper presents the architecture of a new climate-control system that is under development in the XERIC project, funded within the Horizon 2020 EU program, that aims to increase Battery Electric Vehicles (BEV) autonomy by reducing more than 50% the energy used all over the year for passenger comfort in all weather conditions. The system combines a traditional Vapor Compression Cycle (VCC) with a liquid desiccant cycle, by taking advantage of an innovative component, called Three-Fluids Combined Membrane Contactor (3F-CMC). The approaches that can be adopted by the XERIC system to face the different seasonal needs are shown. Moreover, numerical models developed in the Matlab/Simulink environment and used to predict the system performance are presented. Finally, first results regarding the experimental campaign performed to link the VCC and the liquid desiccant cycle are discussed.

Keywords: XERIC project; Hybrid systems for air dehumidification; liquid desiccant; membrane contactors; energy-efficient electric vehicles; AC mobile system.

DOI: 10.1109/EVER.2017.7935954

Repository link: <http://ieeexplore.ieee.org/document/7935954/>

- **A pilot system for the characterization of hydrophobic membrane contactor modules to be used in air handling processes**

#### Abstract

Thermal comfort control in electrical vehicles calls for air conditioning systems with a low energetic demand. The paper describes a pilot system developed in the frame of the “Xeric” EU project in order to study the effect of different operating variables (e.g. desiccant temperature, air velocity) on the performance of hydrophobic membrane based on desiccant air humidification/dehumidification. The overall vapor mass transfer coefficient was estimated in different conditions. By evaluating the membrane mass transfer resistance of the membrane through a modified desiccant inverted cup method, the experimental estimation of the mass transfer resistances in the fluid phases was done. The data obtained through the pilot system are of great interest for the development of air condition systems based on membrane contactors to be used in vehicles cabins.

Keywords: Car cabin environmental conditions; humidity; membrane contactor; hydrophobic membrane; resistance mass transfer model.

DOI: 10.1109/EVER.2017.7935958

Repository link: <http://ieeexplore.ieee.org/document/7935958/>



## Appendix 5: Poster created to promote the XERIC project

### INNOVATIVE CLIMATE-CONTROL SYSTEM TO EXTEND RANGE OF ELECTRIC VEHICLES AND IMPROVE COMFORT

**IN A NUTSHELL**  
 EC Call: H2020-GV-2014  
 Grant agreement n°: 653605  
 Start date: June 1st, 2015  
 Duration: 36 months  
 EC funding: 4 621 280€

#### ISSUE

The limited capacity of electric batteries combined with the substantial amount of energy needed to run auxiliary equipment dramatically affects the range capability of electric vehicles: **the climate control system can absorb up to 40-60% of the energy** available in summer conditions.

**Academia & industry hand in hand to make a reality of innovative climate-control systems for electric vehicles**

#### WHAT'S NEW WITH XERIC?

XERIC develops a hybrid system, **combining a liquid desiccant cycle** (operating on humidity) **with a traditional VCC** (dealing with temperature). In such a system, the VCC operates at higher refrigerant evaporation temperature and at lower condensation temperature. The result is energy saving. This hybrid combination is possible thanks to an **innovative and highly compact three-fluid-combined membrane contactor** that works simultaneously with air, desiccant solution and refrigerant.

#### EXPECTED BENEFITS

XERIC's climate control system will:

- **reduce by more than 50% the energy** used for passenger comfort;
- have a lifetime **superior to 10 years**;
- enable **easy industrialisation** and customisation for electric vehicles currently on the market;
- cost between **1200 and 3000 € per vehicle**.

**www.xeric.eu**

**CONTACT**  
 Project Coordinator  
**Dr. Eng. S. Gaeta,**  
 GVS spa, Bologna, Italy  
 sng@gvs.com

Xeric, Jospel and Optemus, 3 European Projects joined forces and organised a joint event in November on "Improving Energy Management in Electric Vehicles". This event allowed to strengthen collaborations between projects on a common critical research topic.

## Appendix 6: Advertiser published in the EVER Monaco booklet





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**ISSUE**

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- have a lifetime **superior to 10 years**;
- enable **easy industrialisation** and customisation for electric vehicles currently on the market;
- cost between **1200 and 3000 € per vehicle**.



**VENEZ NOUS VOIR STAND 22**

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**EVER 2017**



Xeric, Jospel and Optemus, 3 European Projects joined forces and organised a joint event in November on "Improving Energy Management in Electric Vehicles". This event allowed to strengthen collaborations between projects on a common critical research topic.