



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

# The XERIC Project: Improving Energy Performance in Electric Vehicles



# XERIC at a glance



- **EC-funded** project
- Start: June **2015**
- End: May **2018**

## Aim

Develop an **energy-friendly climate-control system** for electric vehicles able to reduce by more than 50% the energy used for passenger comfort all over the year

## How?

By building a **novel 3F – CMC contactor (gas – liquid)**

## Partners

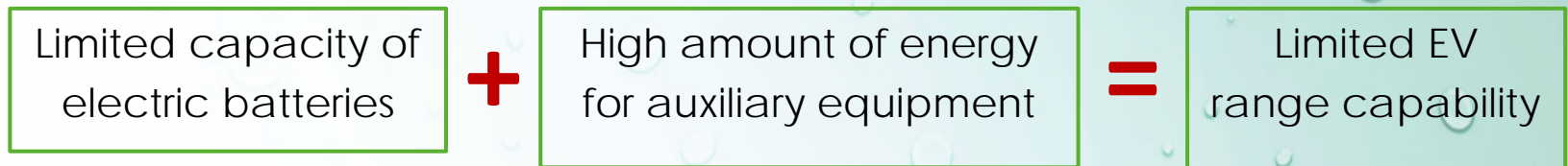
GVS , TICASS + UNIGE , FRAUNHOFER , EMH , FRIGOMAR , UDE , VITO , AIN



# Current bottlenecks & technology

## Climate control systems are very energy-consuming :

In summer conditions, they can absorb up to 40-60% of available energy.



## Techno 1 – Vapor Compression Cycle

Air cooling and dehumidification processes cannot be dealt with separately: air cooled below dew point temperature to decrease the water vapor content.

→ unnecessary air-cooling and subsequent air-heating to dehumidify air in the cabin and maintain comfort conditions.

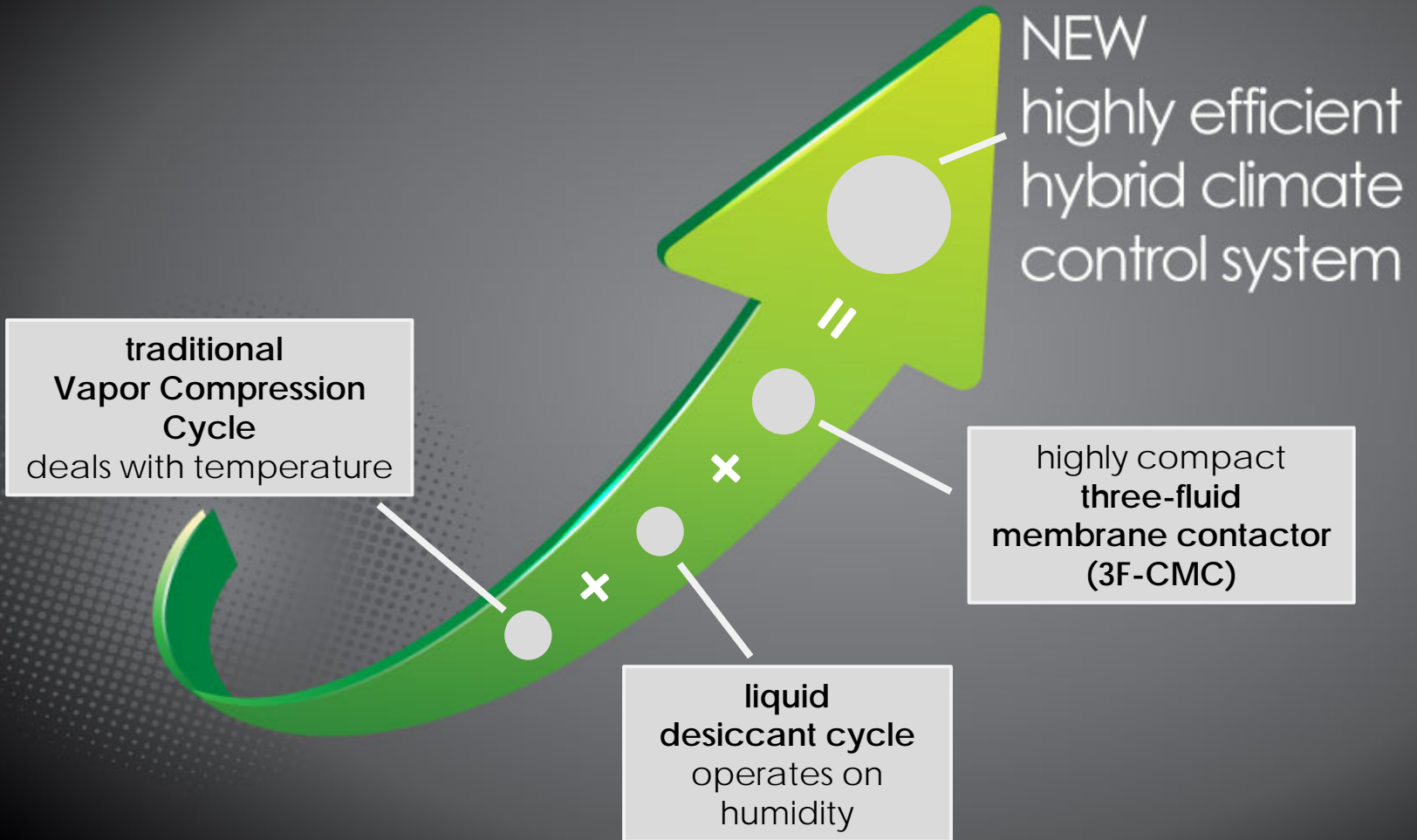
## Techno 2 – Desiccants

Dehumidify air without cooling it AND in an energy efficient way.  
Drawback: system architecture not meant for small electric vehicles.

# What's NEW with XERIC?

XERIC develops a **hybrid system** :

Air is dehumidified without being cooled below its dew point.

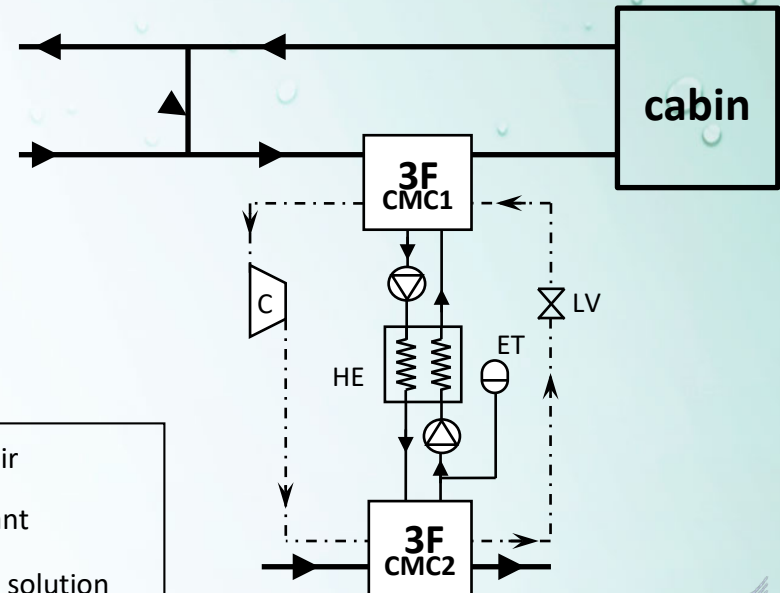
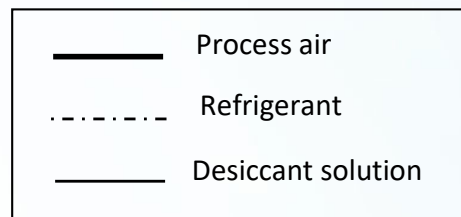


## XERIC's 3F-CMC

- Heat exchange between desiccant & refrigerant allows desiccant temperature to be controlled through all the 3F-CMC
- High efficiency  
(i.e., increase in sensible and latent heat loads that can be faced)
- Compactness

## XERIC's desiccant cycle:

- 3F-CMC1 dehumidifies & partially cools process air
- 3F-CMC2 re-concentrates weak solution
- Economizer HE reduces parasitic heat transfer





## Winter

XERIC's hybrid system can work as a **heat pump** by reversing the direction of the fluid in the refrigeration cycle.

→ passenger compartment heated by using the VCC condenser heat output.

→ heating effect more efficient compared to electrical resistance: passengers comfort can be obtained with less energy.

## Summer & intermediate seasons

XERIC's hybrid system allows energy savings since the VCC cycle operates at:

- higher evaporation temperature;
- lower condensation temperature.

## To sum it up:

### **XERIC's hybrid climate control system is attractive for automotive applications**

- It separates air-dehumidification and air-cooling processes
- no carryover of desiccant droplets into the process air
- It will reduce by more than 50% the energy used for passenger comfort
- It will have a lifetime longer than 10 years
- Cost from 1,200 to 3,000 €
- Compact system
- Easy customisation for electric vehicles
- Easily produced at an industrial scale





# More info about XERIC

[www.xeric.eu](http://www.xeric.eu)

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**A FIRST-CLASS CONSORTIUM**  
8 partners from 4 European countries make up XERIC's team.

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**LATEST NEWS**  
01 Apr 2016  
**XERIC's 3rd Project Meeting**  
XERIC's 3rd Project Meeting will be

**LATEST INTERVIEW**  
Read about Stefano LAZZARI, Researcher at the University of Genoa and Deputy Coordinator of XERIC.  
"My job is challenging, very dynamic and gives me the chance to see both the perspective of students and that of the companies that ask for consultancy."  
[READ MORE](#)

**WHAT DO THEY SAY ABOUT XERIC?**  
**A Sound Concept**  
The concept behind XERIC is valid and will guarantee a step forward towards the reduction of energy consumption for Heating, Ventilation and Air Conditioning systems.  
Excerpt from the report of a



European Research and Innovation Project

**XERIC**

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CRAFTING THE FUTURE OF GREEN VEHICLES

XERIC's brochure

**Partners**

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

**Developing a hybrid system**  
With current technologies, air is dehumidified thanks to climate control systems based on a Vapor Compression Cycle (VCC), which cools air below its dew point. Alternatively, desiccants can be used to dehumidify air without cooling it below its dew point. This is an efficient way which allows controlling temperature and humidity independently.

**Who'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, 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.

**In a nutshell**  
EC Call: H2020-GV-2014  
Grant agreement n° 653465  
Start date: June 1<sup>st</sup>, 2015  
Duration: 36 months  
EC Funding: 4 421 280€

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Delimiting  
XERIC comes from Xeric, which means dry in Greek.



The XERIC partners

