
CITCEA UPC
Boosting the future of energy

The CITCEA-UPC is a Research center of the Technical University of Catalonia – UPC

Founded in 2001

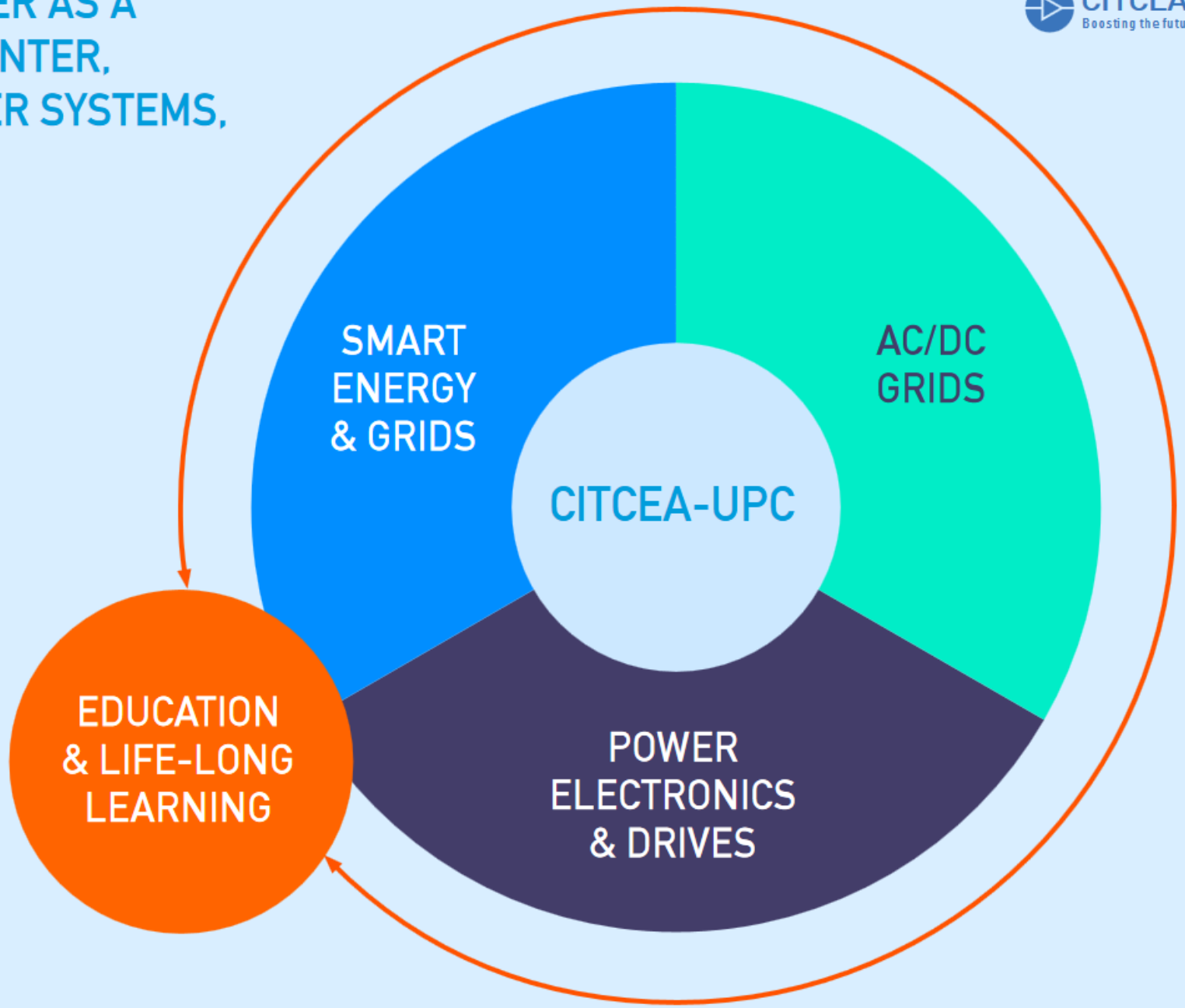
UPC

CITCEA-UPC IS A GLOBAL LEADER AS A RESEARCH AND INNOVATION CENTER, SPECIALIZING IN ENERGY, POWER SYSTEMS, POWER ELECTRONICS AND ELECTROMOBILITY

CITCEA UPC
Boosting the future of energy

CITCEA-UPC offers highly innovative energy solutions with a positive impact on sustainability and the environment.

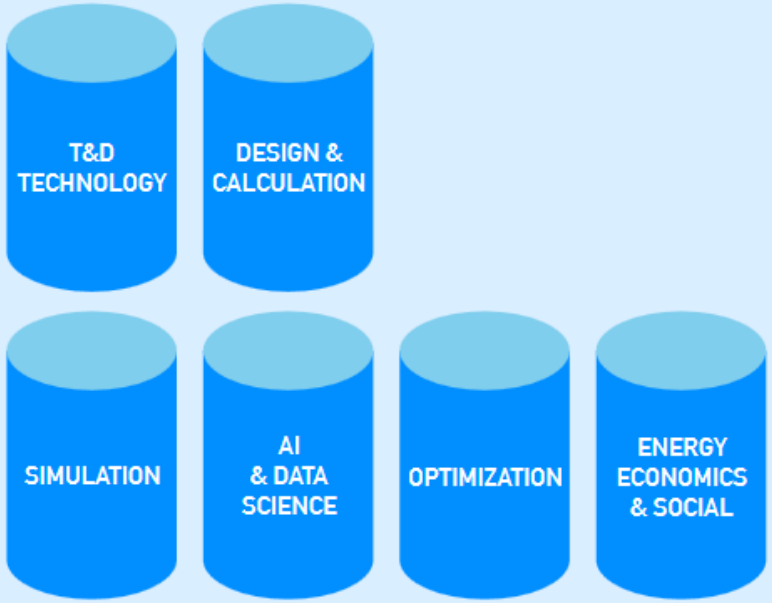
CITCEA-UPC develops R+D+I, technology transfer and training.



SMART ENERGY & GRIDS

CITCEA UPC
Boosting the future of energy

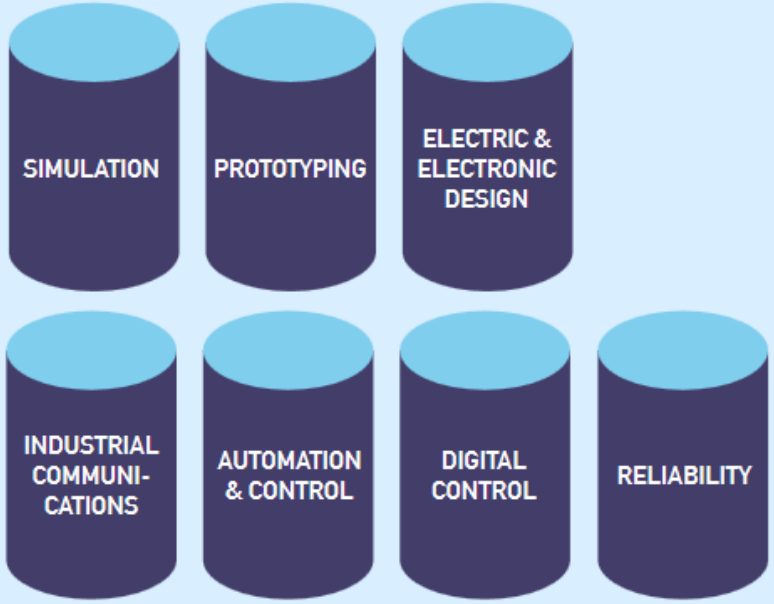
— Operation of modern technologies based on power electronics and artificial intelligence for the decarbonisation of the energy sector.
— The integration of large scale and distributed renewables in the electrical grids and markets.
— Improvement of the efficency of the electricity system.
— Intelligent management of energy: from the point of view of generation of the electricity network as well as electricity consumption and markets.

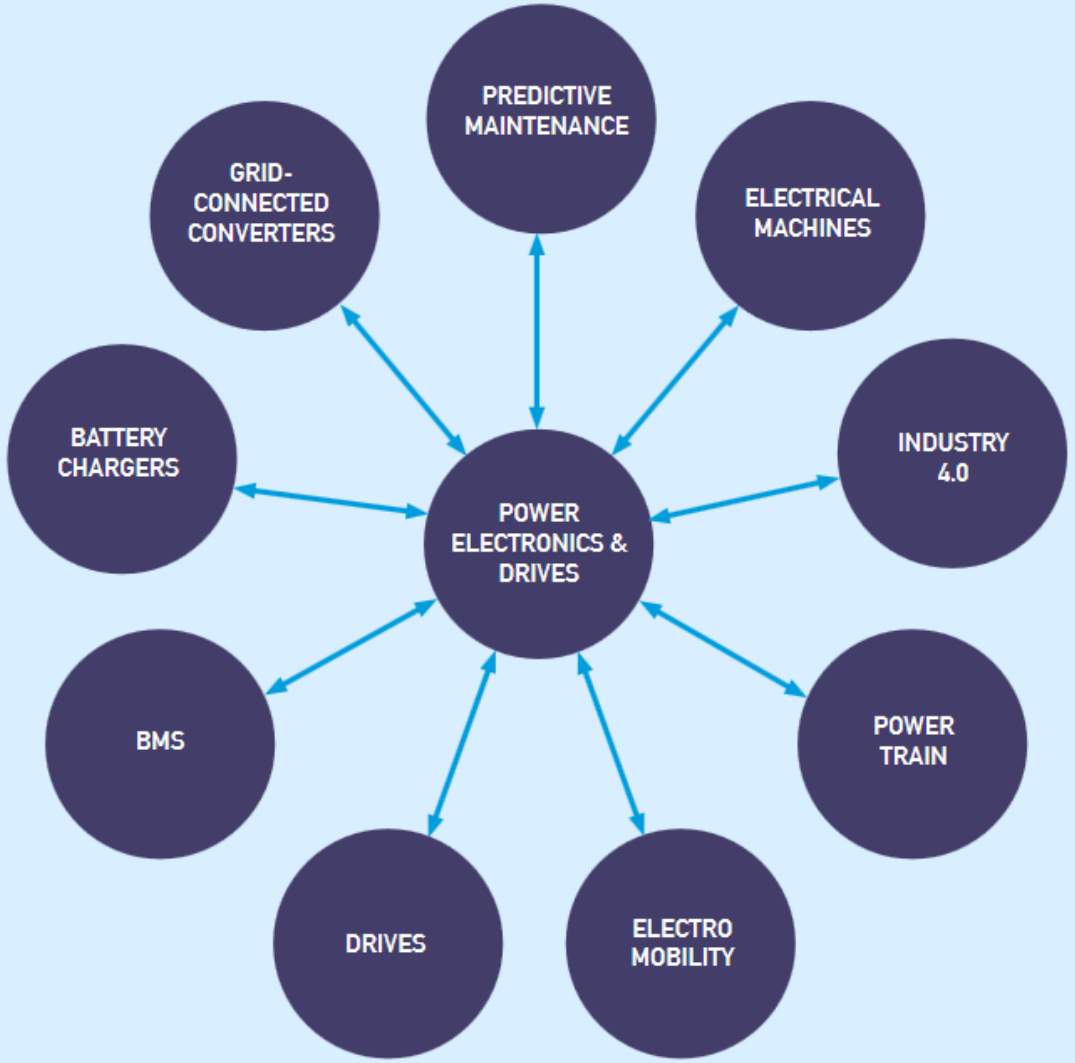


POWER ELECTRONICS & DRIVES

CITCEA UPC
Boosting the future of energy

— Improving the performance and efficiency of Power Trains and drives
— Grid-connected converters
— New converter topologies and components
— Advanced digital control algorithms

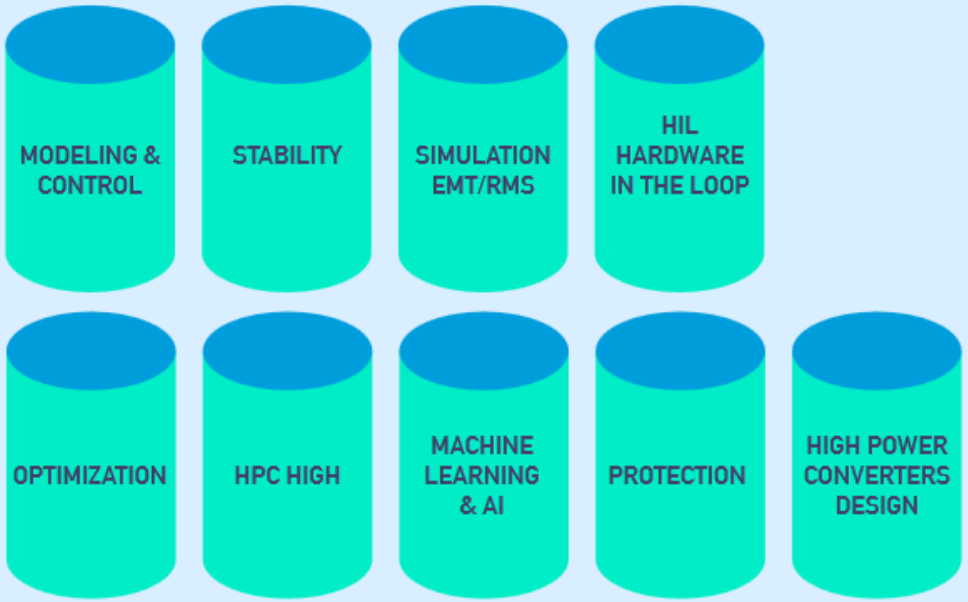




AC/DC GRIDS

CITCEA UPC
Boosting the future of energy

— Understanding modern power systems.
— Developing methodologies and tools for Grid design and planning.
— Operation, control and protection of modern power systems.



ACCIÓ

Generalitat de Catalunya
Government of Catalonia

CITCEA-UPC is part of the TECNIO network, by ACC1Ó (Catalan Government)

Consolidated research center SGR, by AGAUR (Catalan Government)

CITCEA
UPC
Boosting the
future of energy

CITCEA
UPC
Boosting the
future of energy

CITCEA-UPC is constantly growing to become a leading research and innovation center, offering highly innovative energy solutions for the industry with a positive impact on sustainability and the environment

CITCEA
UPC
Boosting the
future of energy

We aim to reduce the impact on the environment,
Improve the reliability and efficiency of the power grid
Reduce the energy loss and energy costs,
And empower electromobility

eRoots

Solutions for
modern power
systems

teknoCEA

2
Spinoffs

CITCEA
UPC
Boosting the
future of energy

Daniel Montesinos

Director

Oriol Gomis

Professor Catedràtic

Samuel Galceran

Professor Agregat

Eduardo Prieto

Professor Agregat

Mónica Aragües

Professor Agregat

Andreas Sumper

Professor Catedràtic

Francisco Díaz

Professor Agregat

Roberto Villafáfila

Professor Agregat

Eduard Bullich

Professor Lector

Joan Marc Rodríguez

Professor Lector

Marc Cheah

Professor Lector

Daniel Heredero

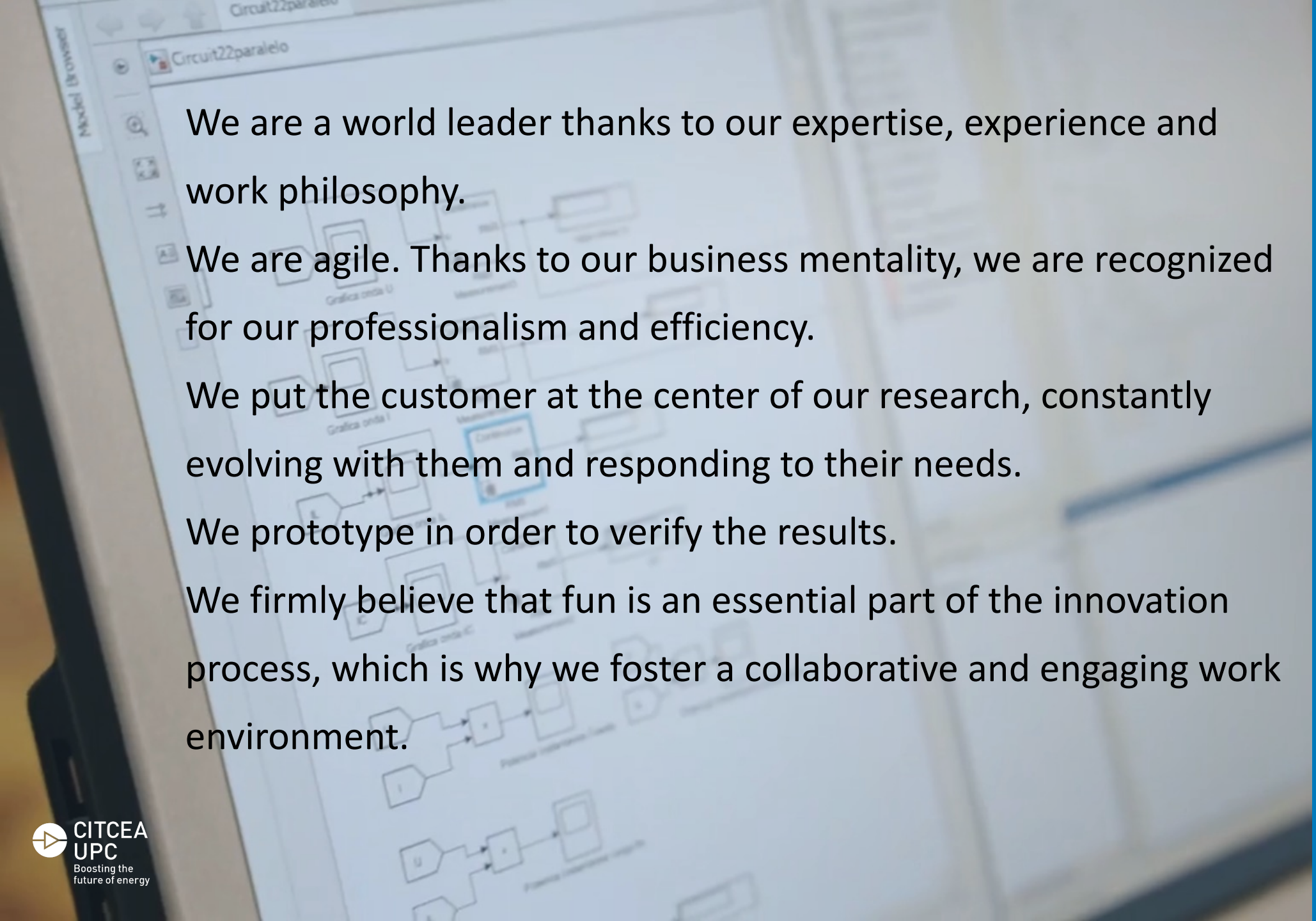
Professor Lector

Vinicius Albernaz

Professor Lector

CITCEA UPC
Boosting the future of energy

13
Professors



We are a world leader thanks to our expertise, experience and work philosophy.

We are agile. Thanks to our business mentality, we are recognized for our professionalism and efficiency.

We put the customer at the center of our research, constantly evolving with them and responding to their needs.

We prototype in order to verify the results.

We firmly believe that fun is an essential part of the innovation process, which is why we foster a collaborative and engaging work environment.

CITCEA
UPC
Boosting the
future of energy

CITCEA
UPC
Boosting the
future of energy

80

People in
Citcea-UPC

Abstract:
This article reviews Flux-Weakening (FW) algorithms for Permanent Magnet Synchronous Machines (PMSMs), focusing on the automotive sector, especially in electric and hybrid electric vehicles. In the past few years, the spread of Electric Vehicles (EVs) has improved the technology of electric machines and their control to achieve more compact and competitive solutions. PMSMs are the most widespread electric machines used in EVs thanks to their high-power density and potential operation at constant power range during high speed. Such high speed implies a high electromotive force. An FW technique is mandatory to reduce the electromagnetic flux generated by the electric machine due to the voltage limits of the traction inverter and the energy source. This article classifies and analyses the state-of-the-art FW control strategies by comparing their main advantages and drawbacks. The Vector Current Control (VCC) method that regulates the modulus of the applied voltage is the most common one in the literature thanks to i) its robustness to parameter modification and model unsureness, ii) low computational complexity, and iii) high dynamic response and control stability.

Published in: IEEE Access (Volume: 11)

Page(s): 22961 - 22981

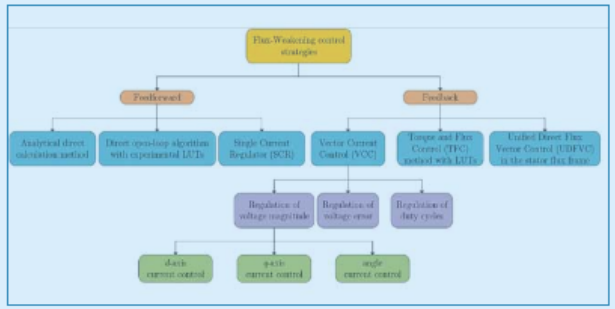
INSPEC Accession Number: 22813524

Date of Publication: 03 March 2023

DOI: 10.1109/ACCESS.2023.3252360

Electronic ISSN: 2169-3536

Publisher: IEEE



+ 400

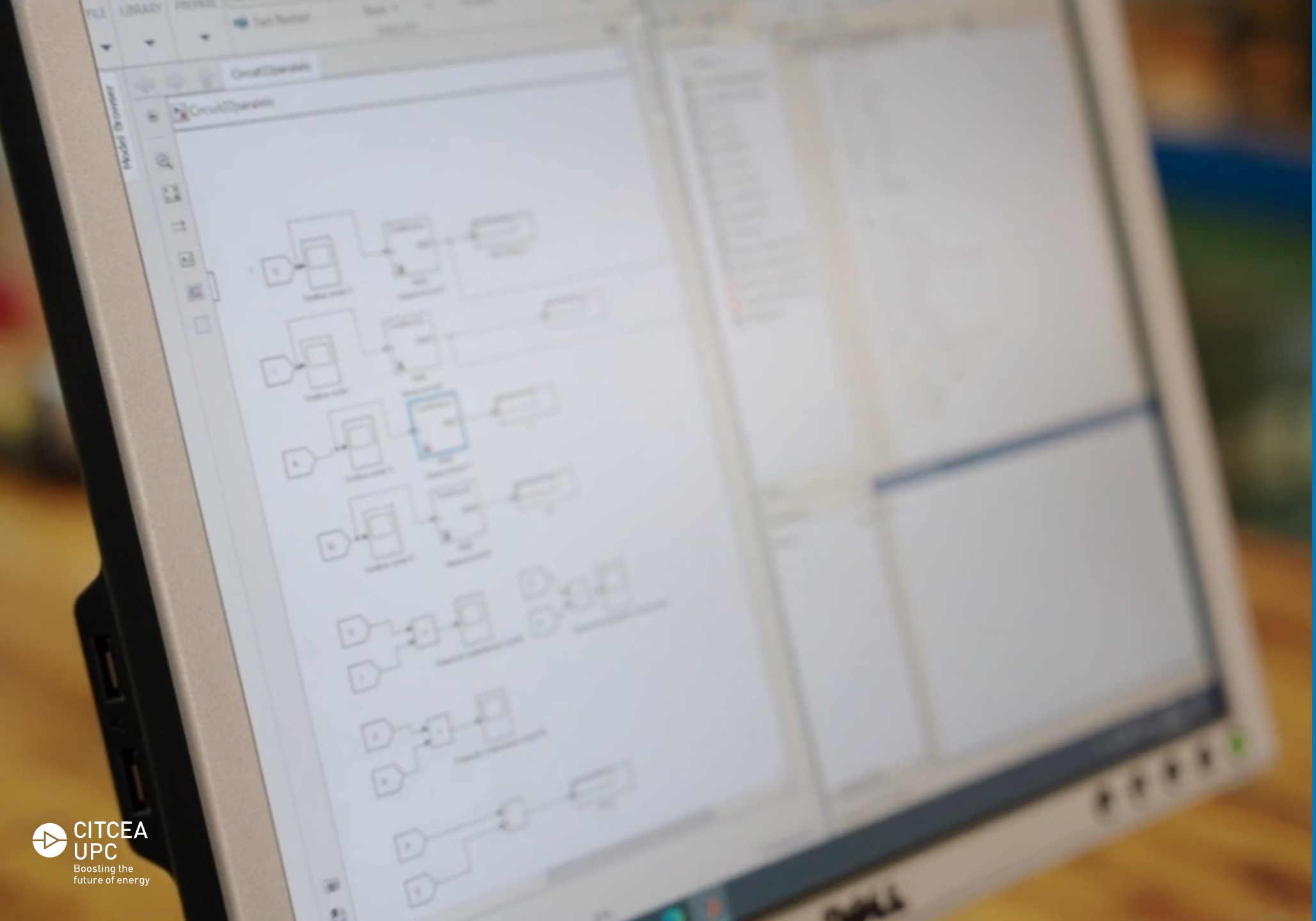
Journal papers

CITCEA UPC
Boosting the future of energy

+ 600

Conference papers

CITCEA
UPC
Boosting the
future of energy



14

Patents

CITCEA
UPC
Boosting the
future of energy

CITCEA
UPC
Boosting the
future of energy

5

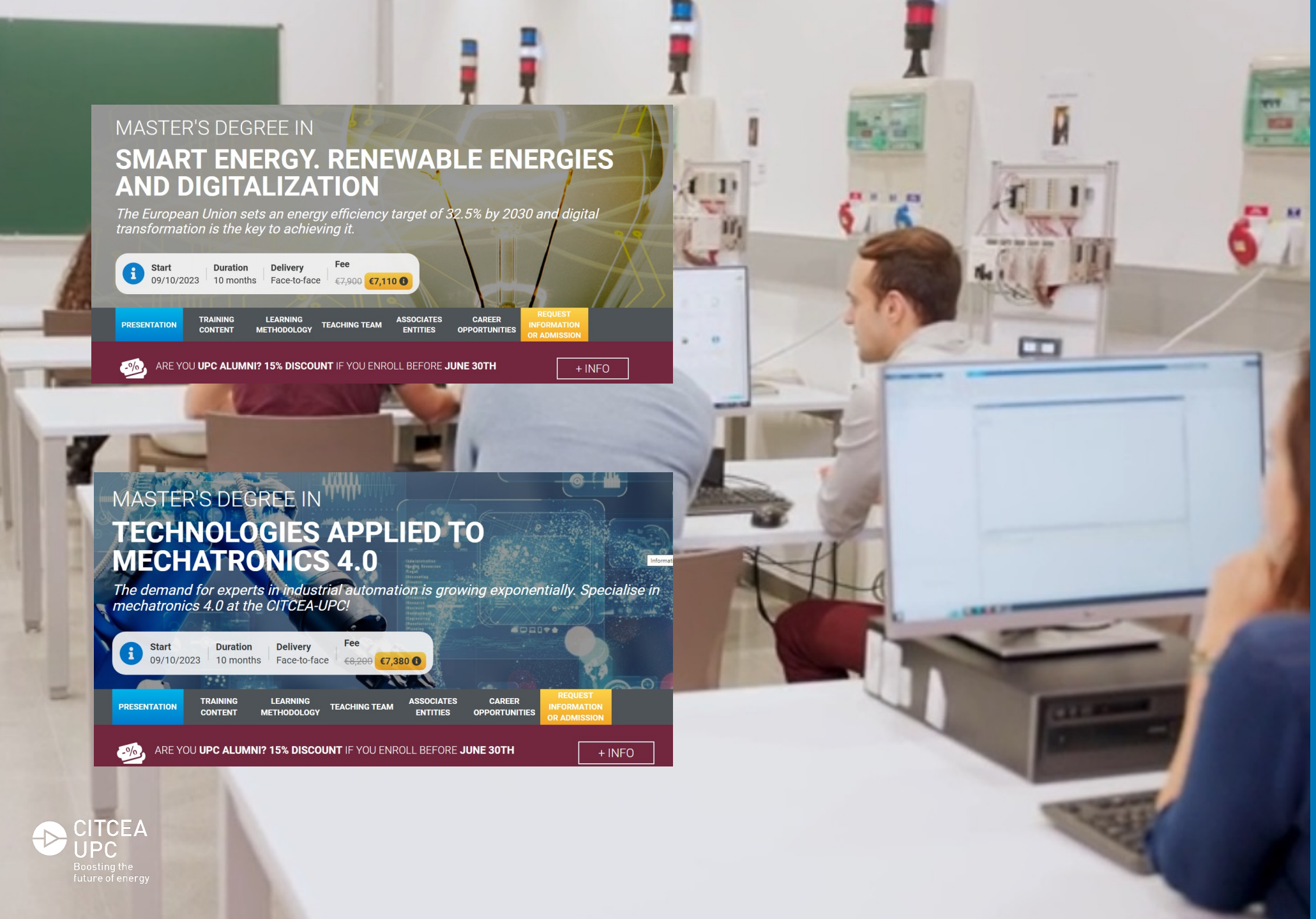
Proyectos Acció/Agaur

11

Proyectos AEI/CDTi

12

European projects. H2020 & HE



CITCEA UPC
Boosting the future of energy

2

Professional Masters

EDUCATION & LIFE-LONG LEARNING

CITCEA UPC
Boosting the future of energy

We transfer the knowledge generated in our research projects, providing specialized training to professionals in the electrical engineering and sustainable energy sector; Adding value to the company's human capital. CITCEA-UPC offers six lines of training:

EDUCATION AT THE UPC

DEGREE:

Teaching and coordination of subjects in:

— Degree in Energy Engineering
— Degree in Electrical Engineering
— Degree in Industrial Technology Engineering

MASTER DEGREE:

Teaching and/or coordination in the following master programmes:

— Master in Industrial Engineering
— Master in Automotive Engineering
— Master in Energy Engineering
— Master in Electric Power Systems and Drives

And linked to EIT INNOENERGY program:

— Master in Energy for Smart Cities
— Master in Smart Electrical Networks and Systems
— Master in Renewable Energy
— Master in Environmental Pathways for Sustainable Energy Systems

PhD PROGRAM IN ELECTRICAL ENGINEERING:

— Supervision of PhD theses in the Department of Electrical Engineering.
— Direction of the PhD program in Electrical Engineering.

INDUSTRIAL PhD PROGRAM:

— Supervision of PhD theses in Electrical Engineering in collaboration with companies.

LIFE-LONG LEARNIG

MASTER'S AND POSTGRADUATE COURSES IN COLLABORATION WITH THE SCHOOL OF PROFESSIONAL AND EXECUTIVE DEVELOPMENT OF THE UPC:

— Master in Technologies Applied to Mechatronics 4.0
— Smart Energy. Energías renovables y digitalización

TRAINING CAPSULES

— Adressing specialized topics in the three thematic areas of CITCEA-UPC: Smart Energy and Grids, Power Electronics and Drives, and AC/DC Grids.
— In the topics of smart grids and energy storage, in collaboration with EIT INNOENERGY program

TAILORED TRAINING FOR INDUSTRY

Long and short-term training to companies.

2
Chairs

CITCEA UPC
Boosting the future of energy

Av. Diagonal, 647,
08028 Barcelona

CITCEA
UPC
Boosting the
future of energy


CITCEA UPC
Boosting the future of energy