



IKERLAN.
WHERE TECHNOLOGY
IS AN ATTITUDE

Most promising disruptive technologies on smart grids and technology transfer success stories

IK4-IKERLAN: Successful K&T transfer from Research Institutions to industry

Andoni Saez de Ibarra, Aitor Milo

26th October, Madrid

A grayscale background image of a person wearing glasses, holding a circuit board in their hand. The board is populated with various electronic components like chips and capacitors. The text 'IKERLAN. WHERE TECHNOLOGY IS AN ATTITUDE' is overlaid in a bright green, bold, sans-serif font. There are also some green decorative lines: a vertical one on the left, a horizontal one on the right, and a horizontal one at the bottom left.

IKERLAN.
WHERE
TECHNOLOGY IS
AN ATTITUDE

A decorative horizontal band at the bottom of the slide featuring a stylized circuit board pattern in shades of blue and white.

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WHERE TECHNOLOGY
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01 OUR
DIFFERENCE
IN 4 KEY
POINTS

— . . —

02 REAL TECHNOLOGY
FOR REAL CHALLENGES

03 CEGASA – IK4-IKERLAN
Successful K&T transfer

— . . —

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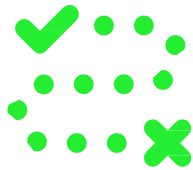


01. OUR DIFFERENCE IN 4 KEY POINTS

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1st Useful technology. Forty years transferring technology to industry

AT IKERLAN,
WE APPLY
TECHNOLOGY BY
CONCEPT, CULTURE
AND ATTITUDE.



REAL TECHNOLOGY
FOR REAL
CHALLENGES

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TECHNOLOGY



UNIVERSITY



IK4-IKERLAN



COMPANIES

PEOPLE

HIGHER EDUCATION

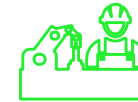
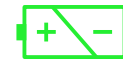
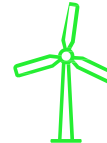


TECHNOLOGY



SPECIALISATION

INDUSTRY



WE COLLABORATE WITH COMPANIES
TO DEVELOP PRODUCTS YOU CAN
USE EVERY DAY.

2nd Together is better. Cooperative organisational model

WE WORK IN COOPERATION



WE COOPERATE
WITH OUR
CUSTOMERS

WE COLLABORATE
ON STRATEGIC DEFINITION
JOINT WORK TEAMS
WE OFFER MULTI-
TECHNOLOGICAL
SOLUTIONS

WE ARE A COOPERATIVE,
CREATED IN 1974 BY THE
COMPANIES OF THE
CURRENT MONDRAGON
CORPORATION



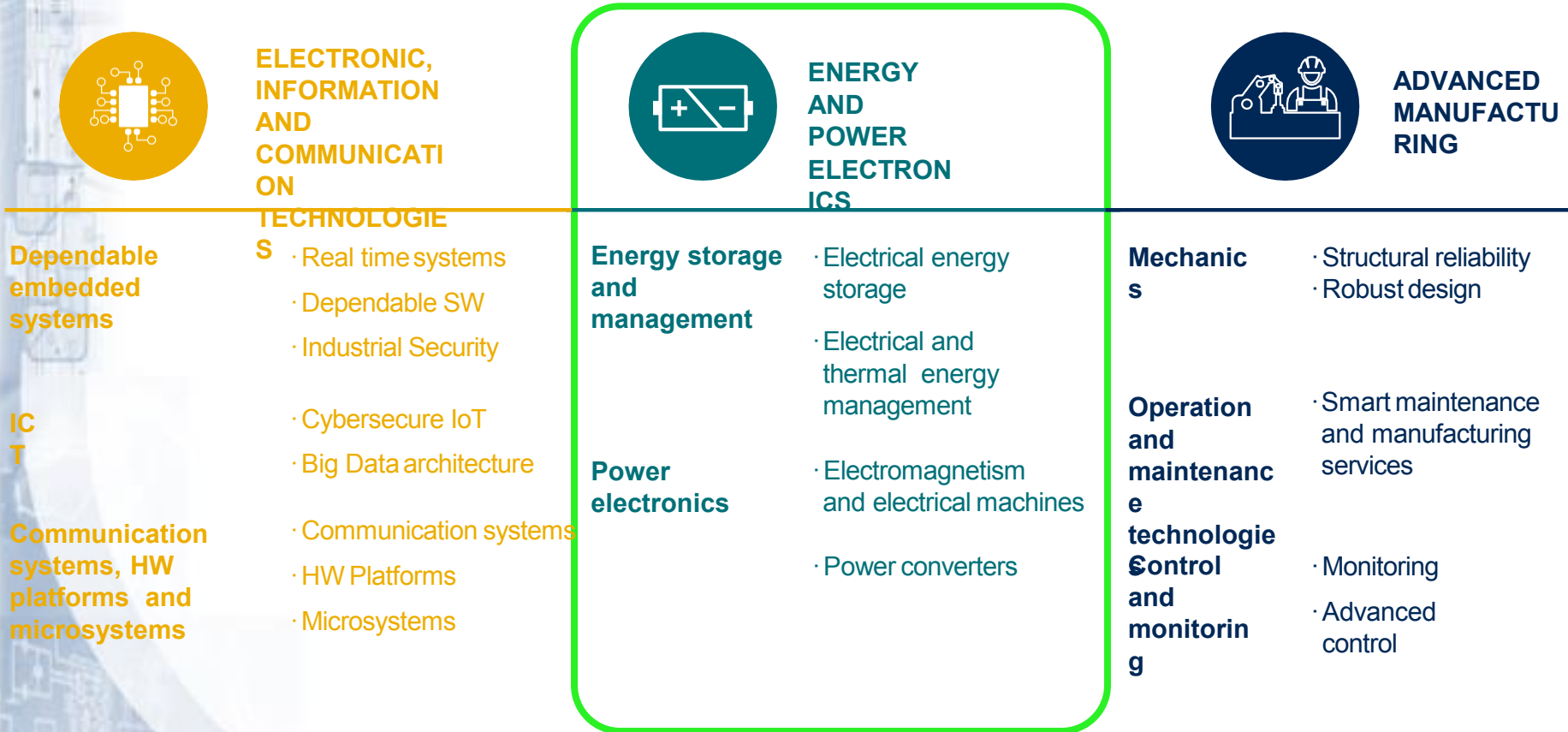
MEMBER OF IK4 AND
RVCTI



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3rd We are technologists.

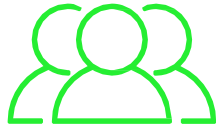
3 areas of technological expertise



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4th Up to date.

Agile technology centre, looking towards the future



OVER

300

PEOPLE QUALIFIED

OVER

20M€

TOTAL INCOME
IN 2016



FACING PRESENT AND
FUTURE TECHNOLOGICAL
CHALLENGES



OVER

11M€

IN TECHNOLOGICAL
TRANSFER TO
COMPANIES
(over 55 % of turnover)

OVER

8M€

IN RESEARCH
PROJECTS IN 2016
(DFG, GV, AGE and H2020)



48

DOCTORAL
THESIS IN
PROGRESS



OBJECTIVE TO
GENERATE NEW
KNOWLEDGE AND
TRAIN RESEARCHERS



A VITAL AND PROACTIVE CENTRE THAT
MOVES WITH AGILITY TO BE ALWAYS
ON THE CUTTING EDGE OF TECHNOLOGY

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02.

REAL TECHNOLOGY FOR REAL CHALLENGES

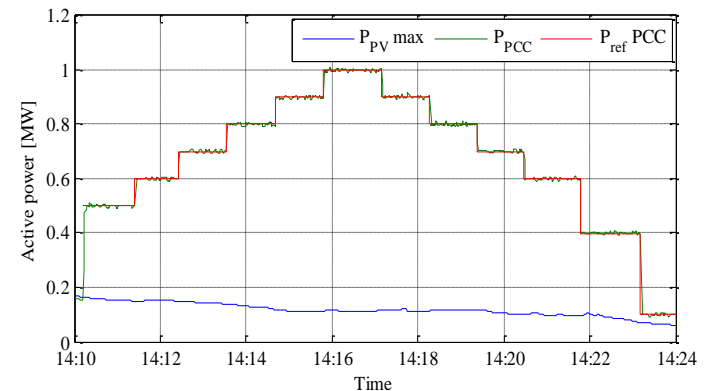
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Case studies: ACCIONA



ACCIONA's PV plant in Tudela, Navarra 1,2 MW PV + Li-ion 1 MW / 560 kWh battery

- Plant controller and plant monitoring system integrated in a PLC.
- Storage system integration and control by the plant controller.
- Controlled active and reactive power exchange as required in P.O.12.2 draft.



ILIS project: 1st implementation in Europe of a 1 MW lithium-ion battery in a PV plant.

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Case studies: CAF



■ Designed characteristics:

- Energy of UC: 1 – 3.5 kWh
- Energy of Li-ion: 20 – 60 kWh
- Autonomy: 500 – 1500 m

■ Several operation modes:

- Catenary connected mode
- Charging mode
- Catenary free mode



- Design of power electronics systems based on silicon carbide
- Ultracapacitor and lithium based storage systems sizing and control



ESS - UC



ESS – Li-ion



Silicon carbide converter



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Case studies: VECTIA



Main characteristics:

- Energy of storage system: 24 kWh
- Storage technology: Li-ion (lithium titanate)
- Charging: pantograph (150kW, 3-5min)
- Energy savings: 30% less fuel consumption

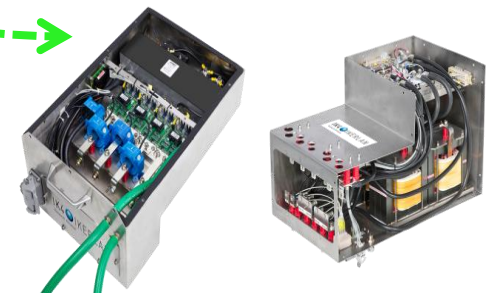
Several operation modes:

- Hybrid mode
- Full electric mode
- Start/Stop + full electric at stops mode



ESS validation

- Design of complete powertrain
- Energy management system development of every power sources
- Ultracapacitor and lithium based storage systems sizing and control



Powertrain design

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Case studies: ORONA



- Main characteristics:
 - 630 – 1600 kg
 - 8 – 21 passengers
 - Variable speed
 - Led lighting
 - Stand-by system

- Several ESS technologies application:
 - NiMH
 - UC
 - Lead acid
 - Li-ion
- Provided services:
 - Consumption peak reduction
 - Connection simplification (from three phase to single phase)
 - Rescue service

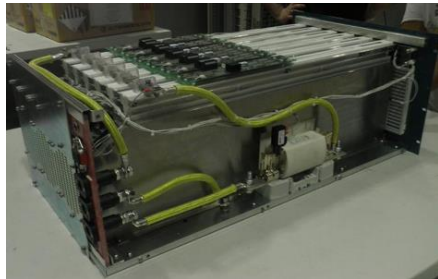


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Case studies: CEGASA



ALIA2 project: Lithium-ion Storage for Advanced Applications



Module



String with 4 modules

- Module design and development:
 - Number of cells: 36
 - Nominal voltage: 133 V
 - Energy: 5.3 kWh
 - Nominal power: 10.6 kW
- BMS design and development
- String electro-mechanical implementation



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CASE STUDY: CEGASA

From ALIA2 research project to product ROOK in the market

TR@NSENER Project

26th October, Madrid

Results of the project

In our opinion, ALIA2 was a very successful project because a battery systems was developed and validated using real prototypes at lab scale.

However, the most interesting result of the project was his future: this projects was the starting point for the development of real products along the next years



i-SARE microgrid

Objective: Experimental micro grid with elements of generation and storage for the improvement of efficiency and cost

Product of CEGASA: Lithium-ion battery, Lead-acid battery, Fuel cell and converters

Power electronics:



System Characteristic

Energy Li ion NMC	21 Kwh
Energy OPZV	45 Kwh
Maximun Power Generador H2	5 Kw



Results: All the components are installed and running in iSARE facilities in San Sebastian, Spain.



EV charge station

Objective: Reduce the peak power in the grid during rapid charge of EVs

Product of CEGASA: Lithium-ion battery

Power electronics: *Ingeteam*

System Characteristic	
Energy	53Kwh
Max.power	200 Kw
Voltage	486-756 VDC
I max (discharge)	400 A
I max (charge)	240 A



Results: Communications battery-DC/DC validated in Ingeteam facilities. Batteries supplied to Repsol.

Weak grid support



Objective: Frequency-power regulation, voltage-power regulation, island mode and charge modulation in a weak grid area

Product of CEGASA: Global storage solution including NMC and LFP batteries, converter and container.

Power electronics:  GP Tech

System Characteristic (NMC/LFP)

Energy	106/110 Kwh
Max.power	200 Kw
Nominal Voltage	666/614VDC
I max (discharge)	180/200 A
I max (charge)	180/120A



Results: Communications battery-DC/DC validated in GP Tech facilities. Batteries sent to Brasil.

ARES project

Product of CEGASA:
Lithium-ion batteries

Power electronics: *Ingeteam*

Objective: Frequency-power regulation, voltage-power regulation, charge modulation and voltage dips

System Characteristic	
Energy	381Kwh
Max.power	1 MW
Voltage	583-907 VDC
I max (discharge)	1250 A
I max (charge)	960 A



Results: Communications battery-DC/DC validated in Ingeteam facilities. Container integrated in Seville and validated in Sangüesa, Navarra by CENER.

Grid support



New company, same know how



New owners → New strategy
Same people → Same know-how

Residential self-consumption

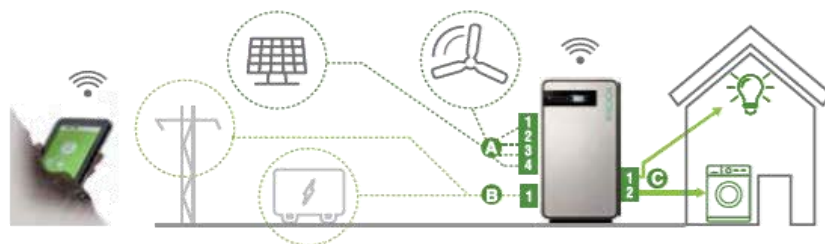
eROOK

GENERATION
& STORAGE
INTEGRATED
SYSTEM



MAIN BENEFITS

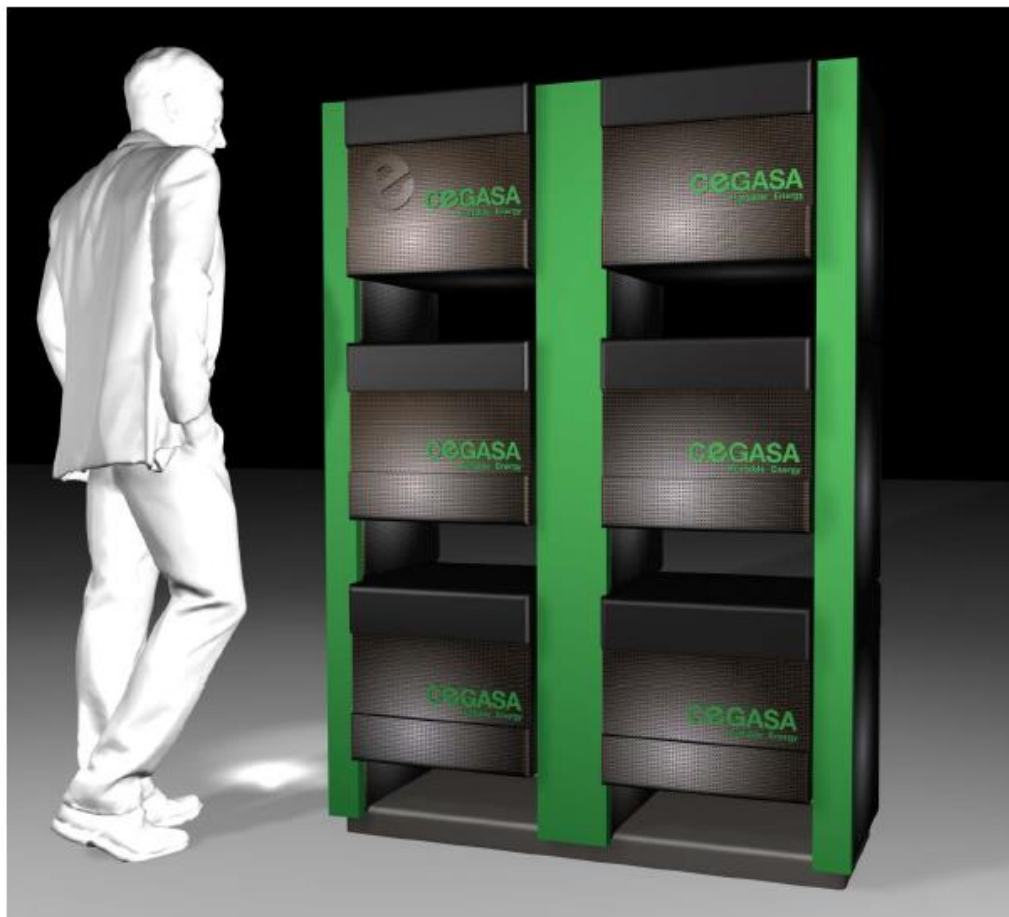
- Ideal for private homes and small bussines
- All-in-one solution for self-generated energy
- Plug & Play installation
- Lithium technology energy storage system and state-of-the-art energy control system
- Up to 10 times less space when compared to lead batteries based systems.
- Works both in isolated facilities and those connected to grid with zero feed-in
- 5&10 kWh models to adapt to your needs
- Maintenance free
- Wireless connection to asociated application and real time data



Industrial self-consumption

MAIN BENEFITS

- Designed for industrial solutions
- Modular systems to adapt different voltage and energy necessities
- From 10 to 200 KWh
- Very easy installation.
- Maintenance free



Conclusions

- ALIA2 was the door of a new world in the storage solutions at large scale for CEGASA
- As a R+D project, it finished in a prototype tested in a lab but the further work allow the company to develop the real product for real markets
- Now, a new CEGASA was born taking all the previous experience to be the most important manufacturer of Li-ion batteries in Spain and one of the main references in Europe offering improved products:
 - designed with the help of important research groups as IKERLAN
 - developed and manufactured in Oñati, Gipuzkoa
 - for mobility, stationary and large scale applications
 - adjusted in performance and price to the final applications
 - with the closest service to the industrial and domestic users

Questions



ceGASA
Portable Energy

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Interreg 
Sudoe
TR@NSENER
European Regional Development Fund