

Partner | **cellcube**
BUILDING ENERGY STORAGE INFRASTRUCTURE



GENERAC



Solar Eco Systems

- Since 2010 -

SUSTAINABILITY AND RESILIENCE

www.StocareEnergie.ro



Solar Eco Systems

*Solar Eco Systems was founded in 2010 with the main objective in renewable energy. In the last decade our activity main focus has been the **design, installation and configuration of projects in the field of energy efficiency and renewable energy.** Our experience in energy storage systems and energy monitoring, control and management has developed **a pipeline for scalable MWh systems with VRFB technology and LFP storage with dedicated inverters.***



+50

Photovoltaic systems installed



+3

Energy Efficiency Projects for Large Buildings



+2

Energy Storage Systems with VRFB



67 kWp Photovoltaic system

Location: Business Center of Renewable Energies, Osorhei Municipality



Project details

- 67 kWp Photovoltaic system
- 5kW Vertical axis wind turbine
- 3kW Horizontal axis wind turbine

Good practices in sustainable development

33 kWp Photovoltaic system

Location: Chişineu Criş sewage treatment plant



Location: Beiuș Municipal Hospital



Project details

- 105 kWp Photovoltaic system
- LED Lighting with Zhaga standard
- LED Lighting with DALI driver
- Automatic water tap for hospitale use

100 kWh Energy Storage System

Good practices in sustainable development

105 kWp Photovoltaic system și Energy Storage System 100 kWh

Location: Salonta Municipal Hospital



CellCube energy storage system

Intelligent energy storage systems based on vanadium redox flow technology (VRFB)

ENVIRONMENTAL IMPACT VRFB vs. LiB

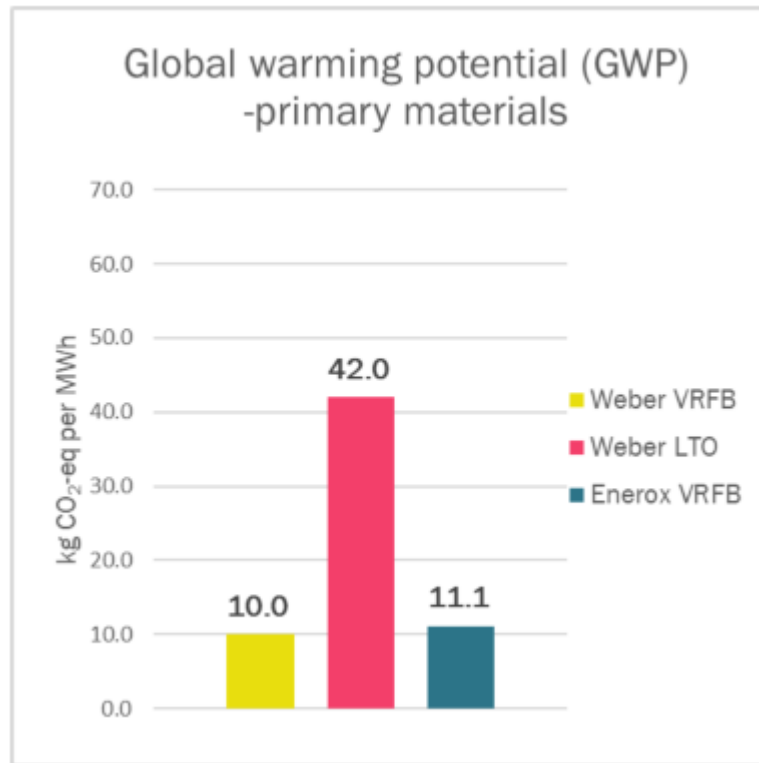
- Identify environmental hot spots within the product life cycle
- Address and minimize environmental impacts by promoting other processes and materials
- Compare results with other storage technologies
- Mitigate measures and impact-orientated interventions



CellCube energy storage system

IMPACT INCLUDING REUSED MATERIALS for both technologies per MWh:

lithium-iron-phosphate based cathode with lithium titanate anode, and VRFBs



- ▶ The CellCube system lowers its impact by 21.5 kg CO₂-eq per MWh (± 66 %).
- ▶ Nevertheless, if reused materials are included in LTOs too, LTOs generate 30.9 kg CO₂-eq more than Enerox VRFB for every 1 MWh capacity.

System and scenarios life cycle assessment

- ✓ FB 500-2000 Rel.4.0
- ✓ ISO 14040/14044 standard compliant
- ✓ Cradle-to-gate incl. provision of energy over lifetime
- ✓ 4h system, 1 cycle per day, 20 years lifetime

This LCA and the cited studies show that VRFBs offer a highly favorable environmental footprint for large-scale energy storage solutions compared to the more ubiquitous LiB technology. Even with rather conservative estimates on the impact of vanadium production, Enerox VRFB has only 66% of the global warming potential compared to an LTO counterpart.

The sensitivity analysis of these technologies (VRFB and LiB), especially with regard to material sourcing considerations has highlighted a crucial advantage of the VRFB technology: the reusability of the vanadium electrolyte and the ability to utilize waste from other processes for electrolyte production.

Furthermore, by accounting for all components, the LCA showed that 85.5% of the whole Enerox CellCube FB 500-2000 Rel.4.0 battery is directly reusable at the end-of-life (by weight). The remaining materials are mostly recyclable.

This gives the VRFB technology a solid foundation to offer a green solution to the world's energy transition.

Electrolyte and battery systems are reusable, part of the circular economy, safe and with low environment impact



Vanadium as by-product of the steel industry

CellCube utilises V_2O_5 (Vanadium pentoxide) in the production of the electrolyte which comes from a mix of iron ore processed for steel production, spent catalysts, vanadium bearing cokes and ashes as well as recycled vanadium



Electrolyte is part of the Circular Economy

Electrolyte is stable and does not degrade over time. Min. 97,5 % of the electrolyte from old batteries, can be reused in new batteries indefinitely



Non rare earth metal used

Unlike lithium batteries (LiBs), VRFB do not require rare earth metals



Environmentally safe

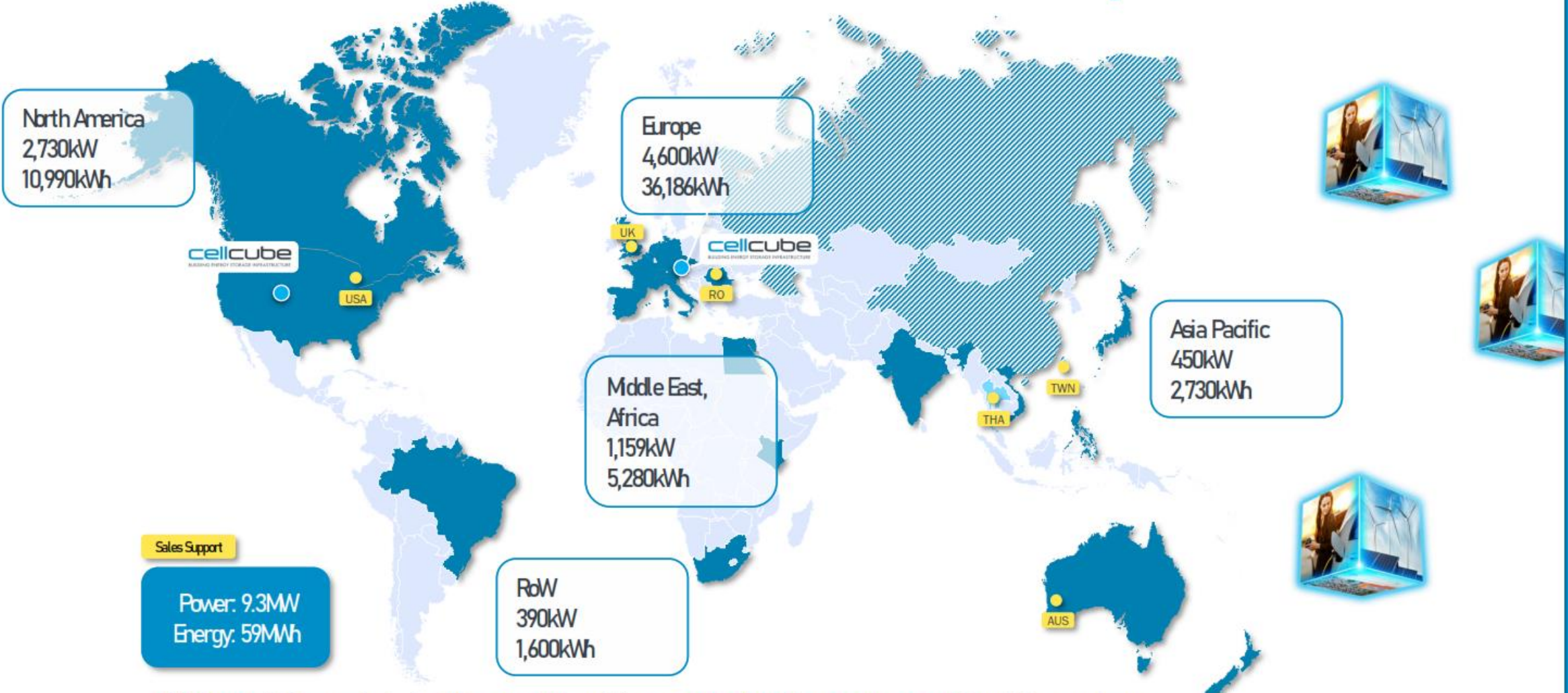
CellCube has had zero electrolyte spills since inception. CellCube utilises double layered tanks with a guaranteed lifetime of 25 years to store the electrolyte to prevent spillages



End-of-Life treatment of the battery system

85,5% of the whole battery system (e.g. FB500-2000) is reusable at the End-of-life

CellCube's track record of globally deployed systems makes us the VRFB market leader in the LDES space



Sales Support

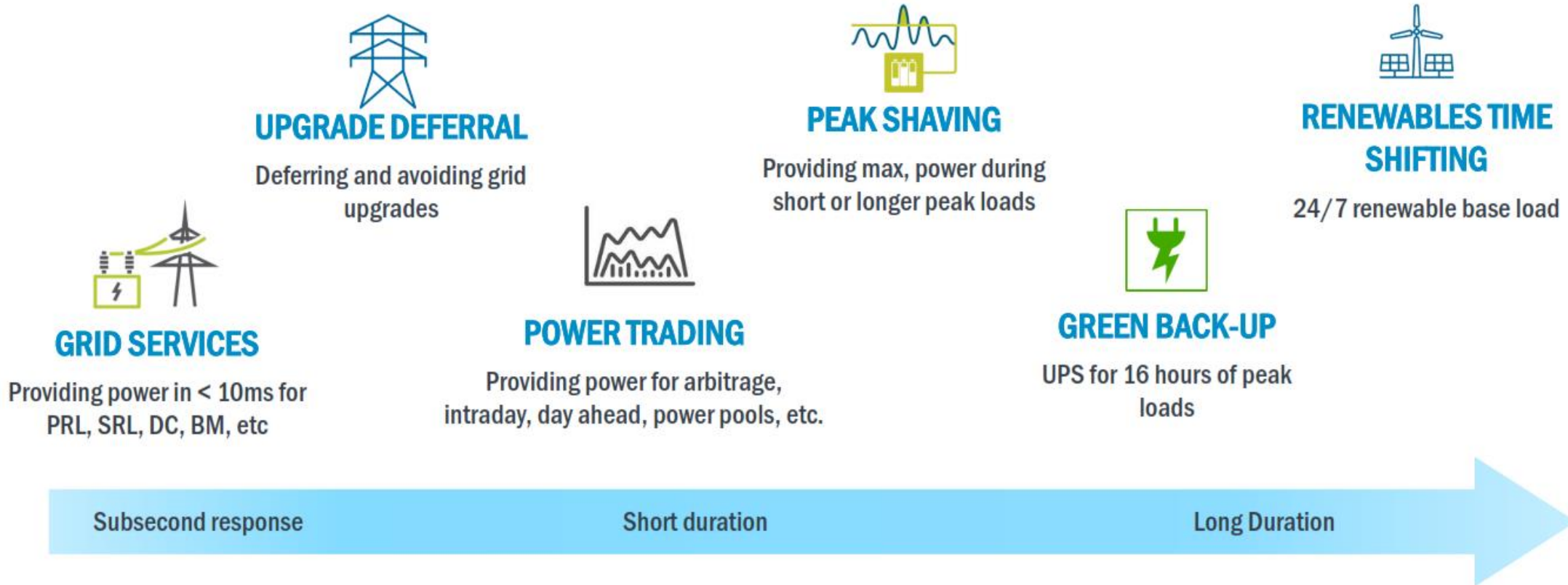
Power: 9.3MW
Energy: 59MWh

RoW
390kW
1,600kWh

We have 130+ projects in 20+ countries with an **operational success record** involving systems operating for over 10 years without interruption totaling 6m operating hours

Future stationary energy storage requirements are moving towards long duration energy storage applications

LDES applications



We offer our customers end-to-end solutions and services packed with the experience of 6m+ operating hours



Turn-Key Solutions and Systems

- Containerized AC/DC energy storage systems
- Integrated battery management systems
- Installation, integration and commissioning
- Customised solution depending on use case



Professional services & Solution design

- Feasibility analysis, modelling and project system simulation
- System integration services for hybrid solutions
- Customized solutions and R&D
- Project development support for IPP and PPA businesses







O&M services

- Bankable performance guarantees
- Multi-level maintenance packages: Basic system maintenance and Extended System Warranty
- Monitoring and Lifetime upgrade services



Electrolyte as a service

- Reduces capital intensity of CellCube enabling customers to reduce Capex
- Reliable operation

Guarantee Agreements	Availability Guarantee	Guaranteed uptime availability (min. 96%*)			
	Performance Guarantee	Guaranteed power (min. 96%*) Guaranteed energy (98% SOC BOL)			
* dependent on PCS and additional BoP scope					
Maintenance Agreements		 Helpdesk	 Spare Parts	 Work time	 Travel time
	Premium Maintenance (Extended Warranty)	✓	✓	✓	✓ (≤ 4h.)
	Basic Maintenance (incl. annual inspection)	✓		✓	
	Standard Warranty	✓	✓	✓	✓

CellCube is the benchmark in VRFB long duration energy storage technology



MADE BY GLOBAL MARKET LEADER

50%+ market share with 130+ projects globally deployed



EASY TO SCALE

adding power and energy modules when needed



HIGH PERFORMANCE

Industrial grade heavy duty use long-lasting (Up to 30 years and 20,000+ cycles), multi-cycling per day, 100% usable depth of discharge



SUSTAINABLE & REUSABLE

No degradation, 25+ year life, re-usable, local assembly, repair friendly, no rare earths
Contribution to a Circular Economy



SUBSECOND - 24h DURATION

Future proof - widest range of applications
Supply to meet demand from 0ms to 24hrs



200% POWER OVERRATING

without loss of delivered power



BANKABLE

A+ rated warranty insurance
decades of validation



SAFE

Non-flammable, non-explosible,
no leakage,
build-in-safety

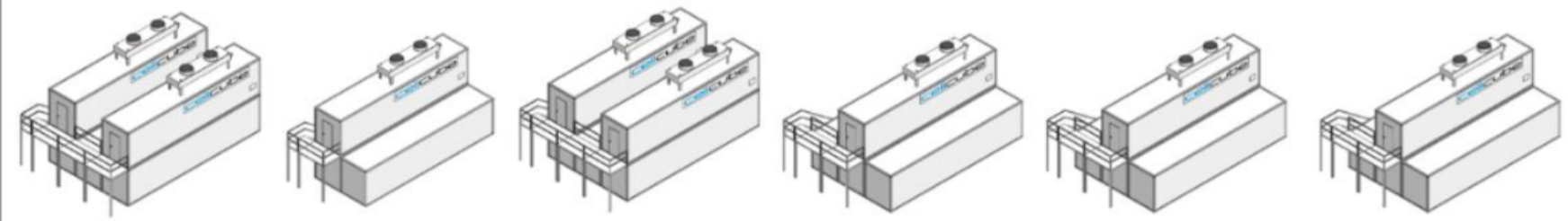


RELIABLE

10+ years in continuous operation



Technical Data



Type		FB 667-4	FB 333-4	FB 500-5	FB 333-8	FB 250-10	FB 200-13
No. of Power Units (top containers)		2	1	2	1	1	1
No. of Energy Units (bottom containers)		3	2	3	3	3	3
Number of inverters rated / incl. over-rating		1 / 2	1 / 1	1 / 2	1 / 1	1 / 1	1 / 1
Battery technology		Vanadium Redox Flow Battery					
Battery performance AC	1)						
Rated charge / discharge AC power	2)	667 kW	333 kW	500 kW	333 kW	250 kW	200 kW
Max. charge / discharge AC power		200 % / 150 %	200 % / 150 %	267% / 200 %	200 % / 150 %	267% / 200 %	333% / 250 %
Usable energy at AC POC @ 100% constant rated DC power	3)						
Auxiliary energy not deducted		2,528 kWh	1,264 kWh	2,722 kWh	2,528 kWh	2,722 kWh	2,722 kWh
Auxiliary energy deducted	4)	2,468 kWh	1,234 kWh	2,652 kWh	2,498 kWh	2,648 kWh	2,628 kWh
Discharge time AC, Begin-of-life		3.7 hrs	3.7 hrs	5.3 hrs	7.5 hrs	10.6 hrs	13.1 hrs
Cycle life		> 20,000 @ 100% DOD					

Photovoltaic Systems – On ground and Rooftop

WRITING, AUDITING & SUBMITTING THE PROJECT

Eligibility analysis of a project idea.

Identifying the optimal financing solution.

Preparation of the Financing Application and the required annexes.

Preparation of the Business Plan, including the extended Market Analysis.

Submission of the financing project.

Assistance in signing the financing contract.

PROJECT IMPLEMENTATION & AUDITING

Procurement Plan Management. Assistance during the bidding period.

Preparation of procurement documents, according to the legislation in force.

Record progress of the project according to the financing authorities standards.

Preparation of Refund / Payment requests.

Budget Management.

Early detection of possible changes in the project. Preparation and submission of change notifications.

Assistance in fulfilling the mandatory information and publicity measures.

Assistance in fulfilling the mandatory indicators assumed by the client until the end of the project. Verification of the fulfillment of the mandatory project objectives.

Assistance with the control visits of the authorities.

EXTENDED PROJECT MONITORING

Training on archiving project documents.

Assistance in the preparation of annual sustainability reports.

Future development strategies proposals.

THANK YOU

Contact

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