



Project 101096056 - Crop Responsive Greenhouse Agrivoltaics System with CO2 Enrichment for Higher Yields

Project Handbook

REGACE Consortium

Project 101096056 - Crop Responsive Greenhouse Agrivoltaics System with CO2 Enrichment for Higher Yields

Deliverable information

| | |
|-----------------------------|----------------------------|
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| Lead Partner | Alzahrawy Society (AZS) |
| Author | Michael Eilan |
| Reviewers | Esther Magadley Ronen Katz |
| Dissemination Level | Public |

| REGACE Action Information | |
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| Action acronym | REGACE |
| Grant agreement number | 101096056 |
| Project Officer | Dr. Irene Pinedo |



| | |
|----------------------------|-------------------|
| Project coordinator | Dr. Ibrahim Yehia |
|----------------------------|-------------------|

| | |
|--|---|
| Project start date and duration | 1 February 2023, 36 months |
| Project website | https://regaceproject.com/ |

| Deliverable Information | |
|--|--|
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| Lead beneficiary | Alzahrawy Society |
| Lead Author(s) | Michael Eilan |
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Approvals

| | Name | Organisation | Date | Signature (initials) |
|--------------------|-------------------|-------------------|------------|----------------------|
| Coordinator | Dr. Ibrahim Yehia | Alzahrawy Society | 27/03/2023 | I.Y. |
| WP 2 Leader | Ronen Katz | TriSolar | 27/03/2023 | R.K. |

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Abbreviations

| Full Name | Abbreviation |
|---|--------------|
| Grant Agreement | GA |
| Consortium Agreement | CA |
| Project Officer | PO |
| General Assembly | GAS |
| Project Coordination Team | PCT |
| Description of Action | DoA |
| Work Package | WP |
| | |
| Consortium Members and Affiliates | |
| Alzahrawy Society | AZS |
| Fattoria Solidale Del Circeo Cooperativa Sociale Di Produzione E Lavoro | FSC |
| Universita degli Studi di Roma Tor Vergata | UNITOV |
| Panepistimio Thessalias | UTH |
| Humboldt-Universitaet zu Berlin | HU |
| Tel Aviv University | TAU |
| Universitaet fuer Bodenkultur Wien | BOKU |
| Bio-Gaertnerei Watzkendorf Gmbh | BW |
| Interteam Ltd | IT |
| Agora p.s.v.d. | AG |
| Trisolar - Innowadi Group Ltd | TS |



Introduction

The aim of this Project Handbook is to summarize some key information from the Grant Agreement, and the REGACE Consortium Agreement, CA, in an easily accessible form. In terms of the consortium, the aim is to ensure a smooth implementation of the project by presenting some guidelines on how to work and communicate among partners.

Project Summary

REGACE will develop and validate a disruptive radical innovative technology that will make Agrivoltaics a major contributor to the EU clean energy portfolio. The technology is highly competitive compared to other solutions, because it fully addresses the desired destination impact of clear affordable energy with a projected installed cost for customer of €600 per kilowatt compared to €880 for ground based Photovoltaic fields. Furthermore, the system demonstrated in this project is also cost effective in areas with less sunshine, which currently are outside areas for which Agrivoltaics could be considered. The core technology is a responsive tracking system mounted in the greenhouse driven by a PLC controller that changes the angle of the tracking system according to the plants' needs. We will test a system using CO₂ enrichment as a means to increase electricity production in low light conditions by increasing the angle of incidence of the bifacial panels in the tracking system. The tracking system is hung with a few screws from the supports of the greenhouse, removing the need for wind-proof supports, reducing the price per installed kilowatt. Thus, this technology allows not only for the dual use of land, but also for the dual use of infrastructure. The design of the technology also leads to reduced construction and maintenance costs, duration of execution, and moreover through reduction of CO₂ emissions. In addition to the economic impact, this will also lead to significant positive effect on ecological-environmental sustainability and reduced ecological foot-print through its life-span maintenance and operation. It will also lead to the diversification of the energy producing market with small holding greenhouse owners playing a significant part in the market. The technology will be tested in operational industrial environments in six locations with different greenhouse types and crops.

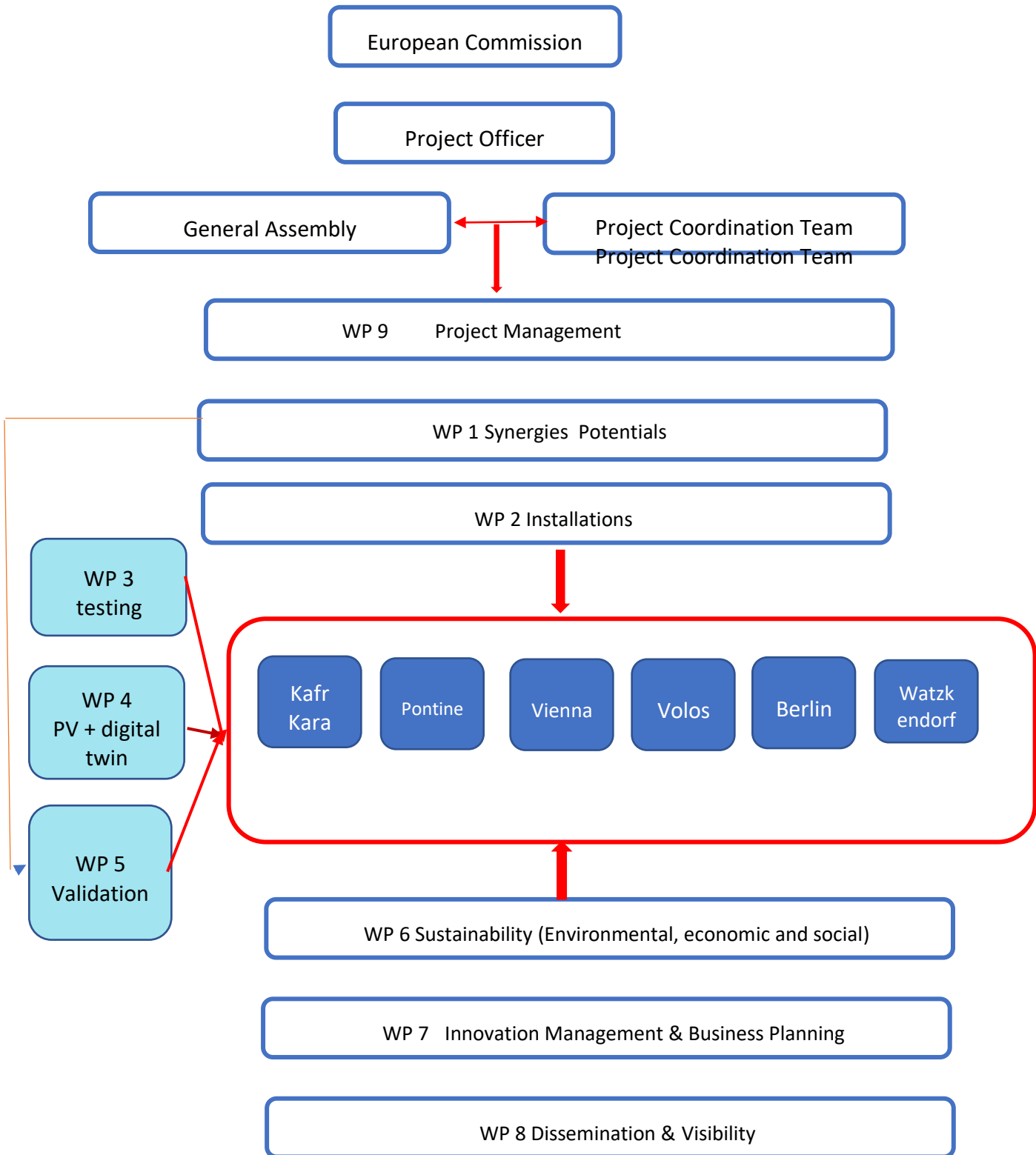


The project's work packages

| WP # | Work Package Title | Lead Short Name |
|-------------|---|------------------------|
| 1 | Potentials of the synergies of innovative and intelligent agrivoltaic systems | UTH |
| 2 | Implementation | TS |
| 3 | Testing | BOKU |
| 4 | Modelling & Digital Twins | UR |
| 5 | Validation | AZS |
| 6 | Sustainability (Environmental, economic and social) | UR |
| 7 | Innovation Management & Business Planning | TS |
| 8 | Dissemination & visibility | IT |
| 9 | Project Management | AZS |
| | | |



Management Structure



General structure

The organisational structure of the consortium shall comprise the following Consortium Bodies:

- The General Assembly as the ultimate decision-making body of the consortium
- The Project Coordination Team (PCT) as the supervisory body for the execution of the Project, which shall report to and be accountable to the General Assembly
- The Coordinator as the legal entity acting as the intermediary between the Parties and the Granting Authority. The Coordinator shall, in addition to its responsibilities as a Party, perform the tasks assigned to it as described in the Grant Agreement and this Consortium Agreement.

The Project Coordination Team shall consist of, the Coordinator, the Scientific Manager, the RTD Manager, the Innovation Manager and the Administrative Manager. The Coordinator will be Dr. Ibrahim Yehia, (Alzahrawy), the Scientific Manager will be Dr. Esther Magadely (Alzahrawy), the Project Manager will be Mr. Michael Eilan (Alzahrawy), the Innovation Manager will be Mr. Ronen Katz (TriSolar), the Administration Manager will be Mr. Simon van Dam (Interteam) and the Financial Manager will be Mr. Khalil Yehia (Alzahrawy).

An External Expert Advisory Board (EEAB) made up of expert advisors who will give an external opinion on the scientific, technical and exploitation of the Project will be appointed and steered by the General Assembly. The EEAB shall assist and facilitate the decisions made by the General Assembly.



Communications

Internal Communications

Internal communications will be done by e-mail and by meetings with video applications Following is a copy of the interna REGACE mailing list

| Institution | First Name | Surname | E-mail 1 |
|-----------------|---------------------|-------------|--|
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| UTH | Catherine | Baxevanou | cbaxev@gmail.com |



External Communications

The main tool for communication with people and bodies outside the consortium is the project website (<https://regaceproject.com/>) with its contact button that has and will be used by persons and bodies wanting more information on the project.

Meetings

The coordinator will organise meeting of the General Assembly of the consortium and the people who work in the project every six months. These meetings can be held physically or in video conferencing,

The chairperson of a Consortium Body shall prepare and send each Member of that Consortium Body an agenda no later than the 21 calendar of days preceding the meeting ,

External Expert Advisory Board

An External Expert Advisory Board (EEAB) made up of expert advisors who will give an external opinion on the scientific, technical and exploitation of the Project will be appointed and steered by the General Assembly. The EEAB shall assist and facilitate the decisions made by the General Assembly.

The Coordinator will ensure that a non-disclosure agreement is executed between all Parties and each EEAB member.

By way of exception to Section 6.4.4 above, the Parties mandate the Coordinator to execute, in their name and on their behalf, a non-disclosure agreement (hereafter “**NDA**”) with each member of the EEAB, in order to protect Confidential Information disclosed by any of the Parties to any member of the EEAB, either directly or through the Coordinator in the case where the concerned Party gave to the Coordinator its prior written approval for such disclosure. The NDA for the EEAB members is enclosed in Attachment 5. The mandate of the Coordinator comprises solely the execution of the NDA in Attachment 5.



Deliverables

Sorted by due date from the nearest to the latest

| Number | Relative Number in WP | Name | Lead Beneficiary | Due Date (in months) |
|------------|-----------------------|--|------------------|----------------------|
| D16 | D9.1 | Project Management Plan | Alzahrawy | 2 |
| D17 | D9.2 | Project handbook | Alzahrawy | 3 |
| D21 | D9.4 | Data Management POlan | Alzahrawy | 4 |
| D1 | D1.1 | Synergies | UTH | 6 |
| D2 | D2.1 | Initial design and installation guidelines | TriSolar | 8 |
| D4 | D3.1 | Test protocol for bifacial PV characterisation | BOKU | 8 |
| D23 | D9.5 | Updated Project Management Plan | Alzahrawy | 15 |
| D6 | D4.1 | Calibration of model | UNITOV | 18 |
| D8 | D5.1 | Common Manual | Alzahrawy | 24 |
| D12 | D7.1 | Recommendations for improved regulations | time.lex | 24 |
| D11 | D6.2 | Farmers' dialogue report | UNITOV | 32 |
| D24 | D9.6 | Final Project Management Plan | Alzahrawy | 33 |
| D5 | D3.2 | Testing results | BOKU | 34 |
| D10 | D6.1 | Environment impact report | TAU | 34 |
| D3 | D2.2 | CO2 enrichment systems | UBER | 36 |
| D7 | D4.2 | Predictive simulation model | UNITOV | 36 |
| D9 | D5.2 | Technical protocols | Alzahrawy | 36 |
| D13 | D7.2 | Business plan | INTERTEA M | 36 |



| | | | | |
|------------|------|--|------------|----|
| D14 | D7.3 | Roadmap for achieving TRL9 | INTERTEA M | 36 |
| D15 | D8.1 | D&E Plan | INTERTEA M | 36 |
| D18 | D9.3 | Consortium meetings | Alzahrawy | 36 |
| D19 | D2.3 | Final design and installation guidelines | TriSolar | 36 |
| D20 | D4.3 | Digital Twins | UNITOV | 36 |
| D22 | D5.3 | System evaluation | Alzahrawy | 36 |



Milestones

| Work Package No. | Work Package No. | Work Package No. | Due Date | Means of Verification | Work Package No. |
|------------------|--|------------------|----------|--|-------------------|
| M1 | Synergies identified | TriSolar | 6 | D2.1 report | 2 |
| M2 | Adapted tracker and CO2 enrichment technologies installed in all locations | BOKU | 8 | Systems up and running | 3 |
| M3 | Experimental greenhouse testing complete | BOKU | 30 | D3.1-3.2 | 3 |
| M4 | Digital models validated | Alzahrawy | 34 | Models validated | 5 |
| M5 | System Validation complete | UNITOV | 36 | Data analysed and recommendations summarised | 6 |

Deliverable and milestone management

The Deliverable author is responsible for the entity and the editing of a deliverable. The author of the Deliverable is included in the document information table on the cover page. He/she must address potential comments from the reviewers and provide an improved version of the deliverable. The Deliverables should be reviewed internally in the organisation. The reviewers must ensure that the content is consistent with the provided Summary, the objectives of the deliverable, and the scientifically correct. In addition, the reviewers should also perform proof-reading and grammar checks. The reviewer must provide comments or modifications using the track changes features. The deliverables



should be approved by the project partners after it was reviewed internally and by partner reviewers.

Document structure for deliverables

The following general structure should be followed and is as such provided in the deliverable template of the project: This structure is not entirely binding since the content of different deliverables can dictate changes in structure

- Cover page (project title, title of the deliverable, project information table)
- Amendment History
- Table of Contents
- Abbreviations
- Executive summary
- Introductory part
- Core part
- References
- Annexes (optional)

The Word document templates to be used by this project will be stored on the TriSolar drive and are available to all partners at

<https://drive.google.com/drive/folders/19-4HlkjW3E5-DQq7YxRWEpYsmxmo2dGH>

All deliverable documents should be uploaded in the PDF format.

Deliverable Upload

The Project Manager is responsible for uploading deliverables to the participant portal. Deliverables should be sent to the PM at least two working days before the deliverable deadline.

If a task or WP leader believes there is a reasonable chance that they will not have a deliverable ready on the due date they should inform the PM at least one month before the dates so the PM can in turn inform the Project Officer



Management Tools

The main tool used for managing the REGACE project is the Monday application, and the general approach used for planning REGACE is agile project planning. All the work packages and tasks have been entered into the system with specific items and sub items added to clarify the order of activities.

All the people working in the REGACE consortium have been granted guest status which allows them full access to the entire project since all the boards (sections in the application equivalent to the REGACE work packages have been made sharable.

Most of the tasks in the DoA have been broken down into many items and sub items in the Monday application and automatic reminder mechanisms have been set up to ensure smooth operation.

Automatic reminders of deadlines have been entered into the system.

Payments

The Coordinator is obliged to:

1. notify the Party concerned promptly of the date and composition of the amount transferred to its bank account, giving the relevant references
2. perform diligently its tasks in the proper administration of any funds and in maintaining financial accounts
3. undertake to keep the Granting Authority's financial contribution to the Project separated from its normal business accounts, its own assets and property, except if the Coordinator is a Public Body or is not entitled to do so due to statutory legislation.

With reference to Article 22 of the Grant Agreement, no Party shall before the end of the Project receive more than its allocated share of the maximum grant amount less the amounts retained by the Granting Authority for the Mutual Insurance Mechanism and for the final payment.



The transfer of the initial pre-financing, the additional pre-financings (if any) and interim payments to Parties will be handled in accordance with Article 22.1 and Article 7 of the Grant Agreement following this payment schedule:

- after receipt of the initial advance payment the Coordinator shall pay to each Party 40% of its budget as in Annex 2 of the Grant Agreement;
- after finalizing the internal financial report in M12 the Coordinator shall pay out to each Party up to 35% of its budget as in Annex 2 of the Grant Agreement, depending on its reported eligible costs, so that after the second installment, each Party may have received up to 75% of its budget;
- The interim payment by the Funding Authority will be distributed to the Parties proportionally to each Party's funding for costs accepted by the Funding Authority in Reporting Period 1 (RP1 submitted in M18). None of the Parties will receive more than 85% of their Maximum Grant Amount, considering the Article 21.3.2 of the REGACE Grant Agreement which defines a Limit to 90% of the maximum grant amount that includes the 5% amount retained for the Guarantee Fund (Each Party will receive as 1st interim payment the amount of the accepted costs by the Funding Authority in Reporting Period 1 up to 85% of their Maximum Grant Amount).
- after receipt of the final payment the Coordinator shall pay each Party the remaining amount, in accordance with article 7.

