



EUROPEAN COMMISSION
Executive Agency for Small and Medium-sized Enterprises
(EASME)
Director



GRANT AGREEMENT

NUMBER — 734959 — GASFARM

This **Agreement** ('the Agreement') is **between** the following parties:

on the one part,

the **Executive Agency for Small and Medium-sized Enterprises (EASME)** ('the Agency'), under the power delegated by the European Commission ('the Commission'),

represented for the purposes of signature of this Agreement by Head of Unit, Executive Agency for Small and Medium-sized Enterprises (EASME), OPERATIONS, H2020 SME, Bernd REICHERT,

and

on the other part,

'the beneficiary':

SERECO BIOTEST SNC DI LUCA POLETTI (Sereco) SNC, 183117, established in VIA CESARE BALBO 7, PERUGIA 06121, Italy, IT00289900540 represented for the purposes of signing the Agreement by Luca POLETTI

The parties referred to above have agreed to enter into the Agreement under the terms and conditions below.

By signing the Agreement, the beneficiary accepts the grant and agrees to implement it under its responsibility and in accordance with the Agreement, with all the obligations and conditions it sets out.

The Agreement is composed of:

Terms and Conditions

- | | |
|---------|------------------------------------|
| Annex 1 | Description of the action |
| Annex 2 | Estimated budget for the action |
| Annex 3 | Not applicable |
| Annex 4 | Model for the financial statements |
| Annex 5 | Not applicable |
| Annex 6 | Not applicable |

TERMS AND CONDITIONS

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CHAPTER 1 GENERAL

ARTICLE 1 — SUBJECT OF THE AGREEMENT

This Agreement sets out the rights and obligations and the terms and conditions applicable to the grant awarded to the beneficiary for implementing the action set out in Chapter 2.

CHAPTER 2 ACTION

ARTICLE 2 — ACTION TO BE IMPLEMENTED

The grant is awarded for the action entitled '*SMALL-SCALE ANAEROBIC DIGESTION FOR AFFORDABLE, EFFICIENT AND SUSTAINABLE MANAGEMENT OF FARMS WASTE — GASFARM*' ('action'), as described in Annex 1.

ARTICLE 3 — DURATION AND STARTING DATE OF THE ACTION

The duration of the action will be **4 months** as of *01/09/2016* ('starting date of the action').

ARTICLE 4 — ESTIMATED BUDGET AND BUDGET TRANSFERS

4.1 Estimated budget

The '**estimated budget**' for the action is set out in Annex 2.

It contains the budget category, the estimated eligible costs and the form of costs (see Articles 5 and 6).

4.2 Budget transfers

Not applicable

CHAPTER 3 GRANT

ARTICLE 5 — GRANT AMOUNT, FORM OF GRANT, REIMBURSEMENT RATES AND FORMS OF COSTS

5.1 Maximum grant amount

The maximum grant amount is **EUR 50 000** (fifty thousand euros).

5.2 Form of grant, reimbursement rate and form of costs

The grant reimburses **70%** of the action's eligible costs (see Article 6) ('**reimbursement of eligible costs grant**') (see Annex 2).

The estimated eligible costs of the action are **EUR 71 429** (seventy one thousand four hundred and twenty nine).

Eligible costs (see Article 6) for the **costs for the feasibility study** must be declared as the lump sum set out in Annex 2 (i.e. under the form of ‘**lump sum costs**’).

5.3 Final grant amount — Calculation

The final grant amount depends on the proper implementation of the action in accordance with the Agreement’s terms and conditions.

This **amount** is calculated by the Agency — when the payment of the balance is made (see Article 21) — in the following steps:

Step 1 – Application of the reimbursement rate

Step 2 – Reduction due to breach of obligations

5.3.1 Step 1 — Application of the reimbursement rates to the eligible costs

The reimbursement rate (see Article 5.2) is applied to the eligible costs (lump sum costs; see Article 6) declared by the beneficiary and approved by the Agency (see Article 21).

5.3.2 Step 2 — Reduction due to breach of obligations other than improper implementation — Reduced maximum grant amount — Calculation

If the grant is reduced (see Article 43), the Agency will calculate the reduced maximum grant amount by deducting the amount of the reduction (calculated in proportion to the seriousness of the breach of obligations in accordance with Article 43.2) from the maximum grant amount set out in Article 5.1.

In this case, the final grant amount will be the lower of the following two:

- the amount obtained following Steps 1 or
- the reduced grant amount following Step 2.

5.4 Revised final grant amount — Calculation

If — after the payment of the balance (in particular, after checks, reviews, audits or investigations; see Article 22) — the Agency rejects costs (see Article 42) or reduces the grant (see Article 43), it will calculate the ‘**revised final grant amount**’.

This **amount** is calculated by the Agency on the basis of the findings, as follows:

- in case of **rejection of costs**: by applying the reimbursement rate to the revised eligible costs approved by the Agency;
- in case of **reduction of the grant**: in proportion to the seriousness of its breach of obligations (see Article 43.2).

In case of **rejection of costs and reduction of the grant**, the revised final grant amount will be the lower of the two amounts above.

ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS

6.1 Eligible costs

Costs for the budget category:

A. Costs for the feasibility study (direct and indirect costs) are eligible ('eligible costs'), if they correspond to the lump sum set out in Annex 2 and if the corresponding tasks or parts of the action have been properly implemented in accordance with Annex 1.

6.2 Ineligible costs

'Ineligible costs' are:

- (a) costs that do not comply with the conditions set out above (see Article 6.1) and
- (b) costs reimbursed under another EU or Euratom grant (including grants awarded by a Member State and financed by the EU or Euratom budget and grants awarded by bodies other than the Agency for the purpose of implementing the EU and Euratom budget).

6.3 Consequences of declaration of ineligible costs

Declared costs that are ineligible will be rejected (see Article 42).

This may also lead to any of the other measures described in Chapter 6.

CHAPTER 4 RIGHTS AND OBLIGATIONS OF THE PARTIES

SECTION 1 RIGHTS AND OBLIGATIONS RELATED TO IMPLEMENTING THE ACTION

ARTICLE 7 — GENERAL OBLIGATION TO PROPERLY IMPLEMENT THE ACTION

7.1 General obligation to properly implement the action

The beneficiary must implement the action as described in Annex 1 and in compliance with the provisions of the Agreement and all legal obligations under applicable EU, international and national law.

7.2 Consequences of non-compliance

If the beneficiary does not properly implement the action (or part of it), the corresponding costs will be ineligible (see Article 6) and will be rejected (see Article 42).

If the beneficiary breaches any other obligation, the grant may be reduced (see Article 43).

This may also lead to any of the other measures described in Chapter 6.

ARTICLE 8 — RESOURCES TO IMPLEMENT THE ACTION — THIRD PARTIES INVOLVED IN THE ACTION

The beneficiary must have the appropriate resources to implement the action.

If it is necessary to implement the action, the beneficiary may:

- purchase goods, works and services (see Article 10) and
- call upon subcontractors to implement action tasks described in Annex 1 (see Article 13);

In these cases, the beneficiary retains sole responsibility towards the Agency for implementing the action.

ARTICLE 9 — IMPLEMENTATION OF ACTION TASKS BY BENEFICIARIES NOT RECEIVING EU FUNDING

Not applicable

ARTICLE 10 — PURCHASE OF GOODS, WORKS OR SERVICES

10.1 Rules for purchasing goods, works or services

If necessary to implement the action, the beneficiary may purchase goods, works or services.

The beneficiary must make such purchases ensuring the best value for money or, if appropriate, the lowest price. In doing so, it must avoid any conflict of interests (see Article 35).

The beneficiary must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards its contractors.

10.2 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 11 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES AGAINST PAYMENT

Not applicable

ARTICLE 12 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES FREE OF CHARGE

Not applicable

ARTICLE 13 — IMPLEMENTATION OF ACTION TASKS BY SUBCONTRACTORS

13.1 Rules for subcontracting action tasks

If necessary to implement the action, the beneficiary may award subcontracts covering the implementation of certain action tasks described in Annex 1.

The beneficiary must award the subcontracts ensuring the best value for money or, if appropriate, the lowest price. In doing so, it must avoid any conflict of interests (see Article 35).

The beneficiary must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards its subcontractors.

The beneficiary must ensure that its obligations under Articles 35, 36, 38 and 46 also apply to the subcontractors.

13.2 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 14 — IMPLEMENTATION OF ACTION TASKS BY LINKED THIRD PARTIES

Not applicable

ARTICLE 15 — FINANCIAL SUPPORT TO THIRD PARTIES

Not applicable

ARTICLE 16 — PROVISION OF TRANS-NATIONAL OR VIRTUAL ACCESS TO RESEARCH INFRASTRUCTURE

Not applicable

SECTION 2 RIGHTS AND OBLIGATIONS RELATED TO THE GRANT ADMINISTRATION

ARTICLE 17 — GENERAL OBLIGATION TO INFORM

17.1 General obligation to provide information upon request

The beneficiary must provide — during implementation of the action or afterwards — any information requested in order to verify proper implementation of the action and compliance with the obligations under the Agreement.

17.2 Obligation to keep information up to date and to inform about events and circumstances likely to affect the Agreement

The beneficiary must keep information stored in the ‘Beneficiary Register’ (via the electronic exchange system; see Article 52) up to date, in particular, its name, address, legal representatives, legal form and organisation type.

The beneficiary must immediately inform the Agency of any of the following:

- (a) **events** which are likely to affect significantly or delay the implementation of the action or the EU's financial interests, in particular changes in its legal, financial, technical, organisational or ownership situation;
- (b) **circumstances** affecting:
 - (i) the decision to award the grant or
 - (ii) compliance with requirements under the Agreement.

17.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 18 — KEEPING RECORDS — SUPPORTING DOCUMENTATION

18.1 Obligation to keep records and other supporting documentation to support the costs declared

The beneficiary must — for a period of three years after the balance is paid — keep adequate records and other supporting documentation to prove that the corresponding tasks or part of the action as described in Annex 1 have been implemented properly. The beneficiary does not need to identify the actual eligible costs covered or provide supporting documentation (such as accounting statements) to prove the amount declared as the lump sum.

It must make them available upon request (see Article 17) or in the context of checks, reviews, audits or investigations (see Article 22).

If there are on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement (including the extension of findings; see Article 22), the beneficiary must keep the records and other supporting documentation until the end of these procedures.

The beneficiary must keep the original documents. Digital and digitalised documents are considered originals if they are authorised by the applicable national law. The Agency may accept non-original documents if it considers that they offer a comparable level of assurance.

18.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 19 — SUBMISSION OF DELIVERABLES

19.1 Obligation to submit deliverables

The beneficiary must submit the ‘**deliverables**’ identified in Annex 1, in accordance with the timing and conditions set out in it.

19.2 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 20 — REPORTING — PAYMENT REQUESTS

20.1 Obligation to submit the report

The beneficiary must submit to the Agency (see Article 52) the final report set out in this Article. This report includes the request for payment and must be drawn up using the forms and templates provided in the electronic exchange system (see Article 52).

20.2 Reporting period

The action has one reporting period:

- RP1: from month 1 to month 4

20.3 Periodic reports — Requests for interim payments

Not applicable

20.4 Final report — Request for payment of the balance

The beneficiary must submit to the Agency (see Article 52) — within 60 days following the end of the reporting period — a final report, which includes the request for payment of the balance.

The **final report** must include the following:

- (a) a ‘**final technical report**’ containing a **summary** with:
 - (i) an overview of the results;
 - (ii) the conclusions on the action;
 - (iii) the answers to the ‘**questionnaire**’, covering issues related to the action implementation and the economic and societal impact, notably in the context of the Horizon 2020 key performance indicators and the Horizon 2020 monitoring requirements.
- (b) a ‘**final financial report**’ containing a ‘**financial statement**’ from the consortium (see Annex 4), which includes the **request for payment of the balance**.

The financial statement must detail the eligible costs (lump sum costs; see Article 6 and Annex 2).

Amounts which are not declared in the financial statement will not be taken into account by the Agency.

The beneficiaries must **certify** that:

- the information provided is full, reliable and true;
- the costs declared are eligible (i.e. that the action has been properly implemented; see Article 6);
- the costs (i.e. the proper implementation of the action) can be substantiated by adequate records and supporting documentation (see Article 18) that will be produced upon request (see Article 17) or in the context of checks, reviews, audits and investigations (see Article 22).

20.5 Information on cumulative expenditure incurred

Not applicable

20.6 Currency for financial statements

The financial statement must be drafted in euro.

20.7 Language of report

The report (technical and financial final report, including the financial statement) must be submitted in the language of the Agreement.

20.8 Consequences of non-compliance — Suspension of the payment deadline — Termination

If the report submitted does not comply with this Article, the Agency may suspend the payment deadline (see Article 47) and apply any of the other measures described in Chapter 6.

If the beneficiary breaches its obligation to submit the report and if it fails to comply with this obligation within 30 days following a written reminder sent by the Agency, the Agreement may be terminated (see Article 50).

ARTICLE 21 — PAYMENTS AND PAYMENT ARRANGEMENTS

21.1 Payments to be made

The following payments will be made to the beneficiary:

- one **pre-financing payment**;
- one **payment of the balance**, on the basis of the request for payment of the balance (see Article 20).

21.2 Pre-financing payment — Amount — Amount retained for the Guarantee Fund

The aim of the pre-financing is to provide the beneficiary with a float.

It remains the property of the EU until the payment of the balance.

The amount of the pre-financing payment will be EUR **20,000.00** (twenty thousand EURO).

The Agency will — except if Article 48 applies — make the pre-financing payment to the beneficiary within 30 days, either from the entry into force of the Agreement (see Article 58) or from 10 days before the starting date of the action (see Article 3), whichever is the latest.

An amount of EUR **2,500.00** (two thousand five hundred EURO), corresponding to the 5% of the maximum grant amount (see Article 5.1), is retained by the Agency from the pre-financing payment and transferred into the '**Guarantee Fund**'.

21.3 Interim payments — Amount — Calculation

Not applicable

21.4 Payment of the balance — Amount — Calculation — Release of the amount retained for the Guarantee Fund

The payment of the balance reimburses the remaining part of the eligible costs incurred by the beneficiary for the implementation of the action.

If the total amount of earlier payments is greater than the final grant amount (see Article 5.3), the payment of the balance takes the form of a recovery (see Article 44).

If the total amount of earlier payments is lower than the final grant amount, the Agency will pay the balance within 90 days from receiving the final report (see Article 20.4), except if Articles 47 or 48 apply.

Payment is subject to the approval of the final report. Its approval does not imply recognition of the compliance, authenticity, completeness or correctness of its content.

The **amount due as the balance** is calculated by the Agency by deducting the total amount of pre-financing already made, from the final grant amount determined in accordance with Article 5.3:

{final grant amount (see Article 5.3)}

minus

{pre-financing made}.

At the payment of the balance, the amount retained for the Guarantee Fund (see above) will be released and:

- if the balance is positive: the amount released will be paid in full to the beneficiary together with the amount due as the balance;
- if the balance is negative (payment of the balance taking the form of recovery): it will be deducted from the amount released (see Article 44.1.2). If the resulting amount:
 - is positive, it will be paid to the beneficiary
 - is negative, it will be recovered.

The amount to be paid may however be offset — without the beneficiary's consent — against any other amount owed by the beneficiary to the Agency, the Commission or another executive agency (under the EU or Euratom budget), up to the maximum EU contribution indicated, for the beneficiary, in the estimated budget (see Annex 2).

21.5 Notification of amounts due

The Agency will formally notify to the beneficiary the amount due and specify the final grant amount.

In the case of reduction of the grant or recovery of undue amounts, the notification will be preceded by the contradictory procedure set out in Articles 43 and 44.

21.6 Currency for payments

The Agency will make all payments in euro.

21.7 Payments to the beneficiary

Payments will be made to the beneficiary.

Payments will discharge the Agency from its payment obligation.

21.8 Bank account for payments

All payments will be made to the following bank account:

Name of bank: BANCA MONTE DEI PASCHI DI SIENA S.P.A.

Address of branch: VIA ANNIBALE VECCHI, 51-53 PERUGIA, Italy

Full name of the account holder: SERECO BIOTEST SNC DI LUCA POLETTI

Full account number (including bank codes):

IBAN code: IT88T0103003077000000455569

21.9 Costs of payment transfers

The cost of the payment transfers is borne as follows:

- the Agency bears the cost of transfers charged by its bank;
- the beneficiary bears the cost of transfers charged by its bank;
- the party causing a repetition of a transfer bears all costs of the repeated transfer.

21.10 Date of payment

Payments by the Agency are considered to have been carried out on the date when they are debited to its account.

21.11 Consequences of non-compliance

21.11.1 If the Agency does not pay within the payment deadlines (see above), the beneficiary is entitled to **late-payment interest** at the rate applied by the European Central Bank (ECB) for its main refinancing operations in euros ('reference rate'), plus three and a half points. The reference rate is

the rate in force on the first day of the month in which the payment deadline expires, as published in the C series of the *Official Journal of the European Union*.

If the late-payment interest is lower than or equal to EUR 200, it will be paid to the beneficiary only upon request submitted within two months of receiving the late payment.

Late-payment interest is not due if the beneficiary is EU Member State (including regional and local government authorities or other public bodies acting on behalf of a Member State for the purpose of this Agreement).

Suspension of the payment deadline or payments (see Articles 47 and 48) will not be considered as late payment.

Late-payment interest covers the period running from the day following the due date for payment (see above), up to and including the date of payment.

Late-payment interest is not considered for the purposes of calculating the final grant amount.

21.11.2 Not applicable

ARTICLE 22 — CHECKS, REVIEWS, AUDITS AND INVESTIGATIONS — EXTENSION OF FINDINGS

22.1 Checks, reviews and audits by the Agency and the Commission

22.1.1 Right to carry out checks

The Agency or the Commission will — during the implementation of the action or afterwards — check the proper implementation of the action and compliance with the obligations under the Agreement, including assessing deliverables and reports.

For this purpose the Agency or the Commission may be assisted by external persons or bodies.

The Agency or the Commission may also request additional information in accordance with Article 17. The Agency or the Commission may request the beneficiary to provide such information to it directly.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

22.1.2 Right to carry out reviews

The Agency or the Commission may — during the implementation of the action or afterwards — carry out reviews on the proper implementation of the action (including assessment of deliverables and reports), compliance with the obligations under the Agreement and continued scientific or technological relevance of the action.

Reviews may be started **up to two years after the payment of the balance**. They will be formally notified to the beneficiary and will be considered to have started on the date of the formal notification.

If the review is carried out on a third party (see Articles 10 to 16), the beneficiary must inform the third party.

The Agency or the Commission may carry out reviews directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the beneficiary of the identity of the external persons or bodies. It has the right to object to the appointment on grounds of commercial confidentiality.

The beneficiary must provide — within the deadline requested — any information and data in addition to deliverables and reports already submitted (including information on the use of resources). The Agency or the Commission may request the beneficiary to provide such information to it directly.

The beneficiary may be requested to participate in meetings, including with external experts.

For **on-the-spot** reviews, the beneficiary must allow access to its sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the review findings, a '**review report**' will be drawn up.

The Agency or the Commission will formally notify the review report to the beneficiary, which has 30 days to formally notify observations ('**contradictory review procedure**').

Reviews (including review reports) are in the language of the Agreement.

22.1.3 Right to carry out audits

The Agency or the Commission may — during the implementation of the action or afterwards — carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement.

Audits may be started **up to two years after the payment of the balance**. They will be formally notified to the beneficiary and will be considered to have started on the date of the formal notification.

If the audit is carried out on a third party (see Articles 10 to 16), the beneficiary must inform the third party.

The Agency or the Commission may carry out audits directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the beneficiary of the identity of the external persons or bodies. It has the right to object to the appointment on grounds of commercial confidentiality.

The beneficiary must provide — within the deadline requested — any information (including complete accounts, individual salary statements or other personal data) to verify compliance with the Agreement. The Agency or the Commission may request beneficiary to provide such information to it directly.

For **on-the-spot** audits, the beneficiary must allow access to its sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the audit findings, a ‘**draft audit report**’ will be drawn up.

The Agency or the Commission will formally notify the draft audit report to the beneficiary, which has 30 days to formally notify observations (‘**contradictory audit procedure**’). This period may be extended by the Agency or the Commission in justified cases.

The ‘**final audit report**’ will take into account observations by the beneficiary. The report will be formally notified to it.

Audits (including audit reports) are in the language of the Agreement.

The Agency or the Commission may also access the beneficiary’ statutory records for the periodical assessment of unit costs or flat-rate amounts.

22.2 Investigations by the European Anti-Fraud Office (OLAF)

Under Regulations No 883/2013¹ and No 2185/96² (and in accordance with their provisions and procedures), the European Anti-Fraud Office (OLAF) may — at any moment during implementation of the action or afterwards — carry out investigations, including on-the-spot checks and inspections, to establish whether there has been fraud, corruption or any other illegal activity affecting the financial interests of the EU.

22.3 Checks and audits by the European Court of Auditors (ECA)

Under Article 287 of the Treaty on the Functioning of the European Union (TFEU) and Article 161 of the Financial Regulation No 966/2012³, the European Court of Auditors (ECA) may — at any moment during implementation of the action or afterwards — carry out audits.

The ECA has the right of access for the purpose of checks and audits.

22.4 Checks, reviews, audits and investigations for international organisations

Not applicable

22.5 Consequences of findings in checks, reviews, audits and investigations — Extension of findings

22.5.1 Findings in this grant

Findings in checks, reviews, audits or investigations carried out in the context of this grant may lead to the rejection of ineligible costs (see Article 42), reduction of the grant (see Article 43), recovery of undue amounts (see Article 44) or to any of the other measures described in Chapter 6.

¹ Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18.09.2013, p. 1).

² Council Regulation (Euratom, EC) No 2185/1996 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities (OJ L 292, 15.11.1996, p. 2).

³ Regulation (EU, EURATOM) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, EURATOM) No 1605/2002 (OJ L 298, 26.10.2012, p. 1).

Rejection of costs or reduction of the grant after the payment of the balance will lead to a revised final grant amount (see Article 5.4).

Findings in checks, reviews, audits or investigations may lead to a request for amendment for the modification of Annex 1 (see Article 55).

Checks, reviews, audits or investigations that find systemic or recurrent errors, irregularities, fraud or breach of obligations may also lead to consequences in other EU or Euratom grants awarded under similar conditions (**‘extension of findings from this grant to other grants’**).

Moreover, findings arising from an OLAF investigation may lead to criminal prosecution under national law.

22.5.2 Findings in other grants

The Agency or the Commission may extend findings from other grants to this grant (**‘extension of findings from other grants to this grant’**), if:

- (a) the beneficiary is found, in other EU or Euratom grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and
- (b) those findings are formally notified to the beneficiary — together with the list of grants affected by the findings — no later than two years after the payment of the balance of this grant.

The extension of findings may lead to the rejection of costs (see Article 42), reduction of the grant (see Article 43), recovery of undue amounts (see Article 44), suspension of payments (see Article 48), suspension of the action implementation (see Article 49) or termination (see Article 50).

22.5.3 Procedure

The Agency or the Commission will formally notify the beneficiary the systemic or recurrent errors and its intention to extend these audit findings, together with the list of grants affected.

22.5.3.1 If the findings concern **eligibility of costs**: the formal notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings;
- (b) the request to submit **revised financial statements** for all grants affected;
- (c) the **correction rate for extrapolation** established by the Agency or the Commission on the basis of the systemic or recurrent errors, to calculate the amounts to be rejected if the beneficiary:
 - (i) considers that the submission of revised financial statements is not possible or practicable
or
 - (ii) does not submit revised financial statements.

The beneficiary has 90 days from receiving notification to submit observations, revised financial statements or to propose a duly substantiated **alternative correction method**. This period may be extended by the Agency or the Commission in justified cases.

The amounts to be rejected will be determined on the basis of the revised financial statements, subject to their approval.

If the Agency or the Commission does not receive any observations or revised financial statements, does not accept the observations or the proposed alternative correction method or does not approve the revised financial statements, it will formally notify the beneficiary the application of the initially notified correction rate for extrapolation.

If the Agency or the Commission accepts the alternative correction method proposed by the beneficiary, it will formally notify the application of the accepted alternative correction method.

22.5.3.2 If the findings concern **improper implementation** or a **breach of another obligation**: the formal notification will include:

- (a) an invitation to submit observations on the list of grants affected by the findings and
- (b) the flat-rate the Agency or the Commission intends to apply according to the principle of proportionality.

The beneficiary has 90 days from receiving notification to submit observations or to propose a duly substantiated alternative flat-rate.

If the Agency or the Commission does not receive any observations or does not accept the observations or the proposed alternative flat-rate, it will formally notify the beneficiary the application of the initially notified flat-rate.

If the Agency or the Commission accepts the alternative flat-rate proposed by the beneficiary, it will formally notify the application of the accepted alternative flat-rate.

22.6 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, any insufficiently substantiated costs will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 23 — EVALUATION OF THE IMPACT OF THE ACTION

23.1 Right to evaluate the impact of the action

The Agency or the Commission may carry out interim and final evaluations of the impact of the action measured against the objective of the EU programme.

Evaluations may be started during implementation of the action and up to three years after the payment of the balance. The evaluation is considered to start on the date of the formal notification to the beneficiary.

The Agency or the Commission may make these evaluations directly (using its own staff) or indirectly (using external bodies or persons it has authorised to do so).

The beneficiary must provide any information relevant to evaluate the impact of the action, including information in electronic format.

23.2 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the Agency may apply the measures described in Chapter 6.

SECTION 3 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND AND RESULTS

SUBSECTION 1 GENERAL

ARTICLE 23a — MANAGEMENT OF INTELLECTUAL PROPERTY

Not applicable

SUBSECTION 2 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND

ARTICLE 24 — AGREEMENT ON BACKGROUND

Not applicable

ARTICLE 25 — ACCESS RIGHTS TO BACKGROUND

Not applicable

SUBSECTION 3 RIGHTS AND OBLIGATIONS RELATED TO RESULTS

ARTICLE 26 — OWNERSHIP OF RESULTS

Not applicable

ARTICLE 27 — PROTECTION OF RESULTS — VISIBILITY OF EU FUNDING

Not applicable

ARTICLE 28 — EXPLOITATION OF RESULTS

Not applicable

ARTICLE 29 — DISSEMINATION OF RESULTS — OPEN ACCESS — VISIBILITY OF EU FUNDING

Not applicable

ARTICLE 30 — TRANSFER AND LICENSING OF RESULTS

Not applicable

ARTICLE 31 — ACCESS RIGHTS TO RESULTS

Not applicable

SECTION 4 OTHER RIGHTS AND OBLIGATIONS

ARTICLE 32 — RECRUITMENT AND WORKING CONDITIONS FOR RESEARCHERS

Not applicable

ARTICLE 33 — GENDER EQUALITY

Not applicable

ARTICLE 34 — ETHICS

34.1 Obligation to comply with ethical principles

The beneficiary must carry out the action in compliance with:

- (a) ethical principles (including the highest standards of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity⁴ — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct) and
- (b) applicable international, EU and national law.

Funding will not be granted for activities carried out outside the EU if they are prohibited in all Member States.

The beneficiary must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiary must ensure that the activities under the action do not:

- (a) aim at human cloning for reproductive purposes;
- (b) intend to modify the genetic heritage of human beings which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed), or
- (c) intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

34.2 Activities raising ethical issues

Activities raising ethical issues must comply with the ‘**ethics requirements**’ set out in Annex 1.

⁴ The European Code of Conduct for Research Integrity of ALLEA (All European Academies) and ESF (European Science Foundation) of March 2011.

http://www.esf.org/fileadmin/Public_documents/Publications/Code_Conduct_ResearchIntegrity.pdf

Before the beginning of an activity raising an ethical issue, the beneficiary must submit (see Article 52) to the Agency copy of:

- (a) any ethics committee opinion required under national law and
- (b) any notification or authorisation for activities raising ethical issues required under national law.

If these documents are not in English, the beneficiary must also submit an English summary of the submitted opinions, notifications and authorisations (containing, if available, the conclusions of the committee or authority concerned).

If these documents are specifically requested for the action, the request must contain an explicit reference to the action title. The beneficiary must submit a declaration that all the submitted documents cover the action tasks.

34.3 Activities involving human embryos or human embryonic stem cells

Activities involving research on human embryos or human embryonic stem cells may be carried out only if:

- they are set out in Annex 1 or
- the beneficiary has obtained explicit approval (in writing) from the Agency (see Article 52).

34.4 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 35 — CONFLICT OF INTERESTS

35.1 Obligation to avoid a conflict of interests

The beneficiary must take all measures to prevent any situation where the impartial and objective implementation of the action is compromised for reasons involving economic interest, political or national affinity, family or emotional ties or any other shared interest ('**conflict of interests**').

It must formally notify to the Agency without delay any situation constituting or likely to lead to a conflict of interests and immediately take all the necessary steps to rectify this situation.

The Agency may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline.

35.2 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 36 — CONFIDENTIALITY

36.1 General obligation to maintain confidentiality

The parties must keep confidential any data, documents or other material (in any form) that is identified as confidential at the time it is disclosed (**‘confidential information’**).

They may use confidential information to implement the Agreement.

The confidentiality obligations no longer apply if:

- (a) the disclosing party agrees to release the other party;
- (b) the information was already known by the recipient or is given to him without obligation of confidentiality by a third party that was not bound by any obligation of confidentiality;
- (c) the recipient proves that the information was developed without the use of confidential information;
- (d) the information becomes generally and publicly available, without breaching any confidentiality obligation, or
- (e) the disclosure of the information is required by EU or national law.

36.2 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 37 — SECURITY-RELATED OBLIGATIONS

Not applicable

ARTICLE 38 — PROMOTING THE ACTION — VISIBILITY OF EU FUNDING

38.1 Obligation to promote the action and its results — Information on EU funding — Obligation and right to use the EU emblem — Disclaimer excluding Agency responsibility — Agency right to use materials, documents or information

The beneficiary must promote the action and its results.

Any communication activity related to the action must:

- (a) display the EU emblem and
- (b) include the following text:

“This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No [number]”.

Any communication activity related to the action must indicate that it reflects only the author's view and that the Agency is not responsible for any use that may be made of the information it contains.

The Agency may use, for its own communication and publicising activities, information relating to the action, documents notably summaries for publication and public deliverables as well as any other material such as pictures or audio-visual material that it receives from the beneficiary (including in electronic form).

The right to use the beneficiary's materials, documents and information includes:

- (a) **use for its own purposes** (in particular, making them available to persons working for the Agency or any other EU institution, body, office or agency or body or institutions in EU Member States; and copying or reproducing them in whole or in part, in unlimited numbers);
- (b) **distribution to the public** (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes);
- (c) **editing or redrafting** for communication and publicising activities (including shortening, summarising, inserting other elements (such as meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation);
- (d) **translation**;
- (e) giving **access in response to individual requests** under Regulation (EC) No 1049/2001, without the right to reproduce or exploit;
- (f) **storage** in paper, electronic or other form;
- (g) **archiving**, in line with applicable document-management rules, and
- (h) the right to authorise **third parties** to act on its behalf or sub-license the modes of exploitation set out in Points (b),(c),(d) and (f) to third parties if needed for the communication and publicising activities of the Agency.

38.2 Consequences of non-compliance

If the beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 39 — PROCESSING OF PERSONAL DATA

39.1 Processing of personal data by the Agency and the Commission

Any personal data under the Agreement will be processed by the Agency or the Commission under Regulation No 45/2001⁵ and according to the ‘notifications of the processing operations’ to the Data Protection Officer (DPO) of the Agency or the Commission (publicly accessible in the DPO register).

Such data will be processed by the ‘**data controller**’ of the Agency or the Commission for the purposes of implementing, managing and monitoring the Agreement (including checks, reviews, audits and investigations; see Article 22).

The persons whose personal data are processed have the right to access and correct their own personal data. For this purpose, they must send any queries about the processing of their personal data to the data controller, via the contact point indicated in the ‘service specific privacy statement(s) (SSPS)’ that are published on the Agency and the Commission websites.

They also have the right to have recourse at any time to the European Data Protection Supervisor (EDPS).

39.2 Processing of personal data by the beneficiary

The beneficiary must process personal data under the Agreement in compliance with applicable EU and national law on data protection (including authorisations or notification requirements).

39.3 Consequences of non-compliance

If the beneficiary breaches any of its obligations under Article 39.2, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 40 — ASSIGNMENTS OF CLAIMS FOR PAYMENT AGAINST THE AGENCY

The beneficiary may not assign any of its claims for payment against the Agency to any third party, except if approved by the Agency on the basis of a reasoned, written request.

If the Agency has not accepted the assignment or the terms of it are not observed, the assignment will have no effect on it.

In no circumstances will an assignment release the beneficiary from its obligations towards the Agency.

⁵ Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data (OJ L 8, 12.01.2001, p. 1).

CHAPTER 5 DIVISION OF THE BENEFICIARY'S ROLES AND RESPONSIBILITIES
— RELATIONSHIP WITH COMPLEMENTARY BENEFICIARIES — RELATIONSHIP
WITH PARTNERS OF A JOINT ACTION

ARTICLE 41 — DIVISION OF THE BENEFICIARY'S ROLES AND RESPONSIBILITIES
— RELATIONSHIP WITH COMPLEMENTARY BENEFICIARIES — RELATIONSHIP
WITH PARTNERS OF A JOINT ACTION

41.1 Roles and responsibility towards the Agency

The beneficiary has full responsibility for implementing the action and complying with the Agreement.

The beneficiary is itself responsible for:

- (a) monitoring that the action is implemented properly (see Article 7);
- (b) informing the Agency immediately of any events or circumstances likely to affect significantly or delay the implementation of the action (see Article 17);
- (c) submit the deliverables and the report to the Agency (see Articles 19 and 20);
- (d) submit to the Agency in good time any documents or information required by it

and may not subcontract these tasks to any third party.

41.2 Internal division of roles and responsibilities

Not applicable

41.3 Internal arrangements between beneficiaries — Consortium agreement

Not applicable

41.4 Relationship with complementary beneficiaries — Collaboration agreement

Not applicable

41.5 Relationship with partners of a joint action — Coordination agreement

Not applicable

CHAPTER 6 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY
— PENALTIES — DAMAGES — SUSPENSION — TERMINATION — FORCE
MAJEURE

SECTION 1 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY
— PENALTIES

ARTICLE 42 — REJECTION OF INELIGIBLE COSTS

42.1 Conditions

42.1.1 The Agency will — **at the payment of the balance** or **afterwards** — reject any costs which are ineligible (i.e. if the action as described in Annex 1 is not properly implemented; see Article 6), in particular following checks, reviews, audits or investigations (see Article 22).

42.1.2 The rejection may also be based on the **extension of findings from other grants to this grant**, under the conditions set out in Article 22.5.2.

42.2 Ineligible costs to be rejected — Calculation — Procedure

Ineligible costs will be rejected proportionally to the tasks or parts of the action not implemented.

If the Agency rejects costs **without reduction of the grant** (see Article 43) or **recovery of undue amounts** (see Article 44), it will formally notify the beneficiary the rejection of costs, the amounts and the reasons why (if applicable, together with the notification of amounts due; see Article 21.5). The beneficiary may — within 30 days of receiving notification — formally notify the Agency of its disagreement and the reasons why.

If the Agency rejects costs **with reduction of the grant** or **recovery of undue amounts**, it will formally notify the rejection in the ‘**pre-information letter**’ on reduction or recovery set out in Articles 43 and 44.

42.3 Effects

If the Agency rejects costs at **the payment of the balance**, it will deduct them from the total eligible costs declared, for the action, in the financial statement (see Article 20.4). It will then calculate the payment of the balance as set out in Article 21.4.

If the Agency rejects costs **after the payment of the balance**, it will deduct the amount rejected from the total eligible costs declared, in the financial statement. It will then calculate the revised final grant amount as set out in Article 5.4.

ARTICLE 43 — REDUCTION OF THE GRANT

43.1 Conditions

43.1.1 The Agency may — **at the payment of the balance** or **afterwards** — reduce the maximum grant amount (see Article 5.1), if an obligation under the Agreement (other than improper implementation of the action as described in Annex 1) has been breached.

43.1.2 The Agency may also reduce the maximum grant amount on the basis of the **extension of findings from other grants to this grant**, under the conditions set out in Article 22.5.2.

43.2 Amount to be reduced — Calculation — Procedure

The amount of the reduction will be proportionate to the seriousness of the breach.

Before reduction of the grant, the Agency will formally notify a ‘**pre-information letter**’ to the beneficiary:

- informing it of its intention to reduce the grant, the amount it intends to reduce and the reasons why and
- inviting it to submit observations within 30 days of receiving notification

If the Agency does not receive any observations or decides to pursue reduction despite the observations it has received, it will formally notify **confirmation** of the reduction (if applicable, together with the notification of amounts due; see Article 21).

43.3 Effects

If the Agency reduces the grant at the time of **the payment of the balance**, it will calculate the reduced grant amount for the action and then determine the amount due as payment of the balance (see Articles 5.3.4 and 21.4).

If the Agency reduces the grant **after the payment of the balance**, it will calculate the revised final grant amount (see Article 5.4). If the revised final grant amount is lower than of the final grant amount, the Agency will recover the difference (see Article 44).

ARTICLE 44 — RECOVERY OF UNDUE AMOUNTS

44.1 Amount to be recovered — Calculation — Procedure

The Agency will — **at the payment of the balance** or **afterwards** — claim back any amount that was paid, but is not due under the Agreement.

44.1.1 Recovery after termination of a beneficiary's participation

Not applicable

44.1.2 Recovery at payment of the balance

If the payment of the balance takes the form of a recovery (see Article 21.4), the Agency will formally notify a '**pre-information letter**' to the beneficiary:

- informing it of its intention to recover, the amount due as the balance and the reasons why;
- specifying that it intends to deduct the amount to be recovered from the amount retained for the Guarantee Fund and
- inviting it to submit observations within 30 days of receiving notification.

If no observations are submitted or the Agency decides to pursue recovery despite the observations it has received, it will **confirm recovery** (together with the notification of amounts due; see Article 21.5) and:

- pay the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is positive** or
- formally notify to the beneficiary a **debit note** for the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is negative**. This note will also specify the terms and the date for payment.

If payment is not made by the date in the debit note, the Agency will **recover** the amount..

- (a) by ‘**offsetting**’ it — without the beneficiary’s consent — against any amounts owed to the beneficiary by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU’s financial interests, the Agency may offset before the payment date specified in the debit note;

- (b) by **drawing on the Guarantee Fund**. The Agency or the Commission will formally notify the beneficiary the debit note on behalf of the Guarantee Fund and recover the amount:

- (i) not applicable;
- (ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

44.1.3 Recovery of amounts after payment of the balance

If the revised final grant amount (see Article 5.4) is lower than the final grant amount, the beneficiary must repay the difference to the Agency.

The Agency will formally notify a **pre-information letter** to the beneficiary:

- informing it of its intention to recover, the due amount and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If no observations are submitted or the Agency decides to pursue recovery despite the observations it has received, it will **confirm** the amount to be recovered and formally notify to the beneficiary a **debit note**. This note will also specify the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Agency will **recover** the amount:

- (a) by ‘**offsetting**’ it — without the beneficiary’s consent — against any amounts owed to the beneficiary by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU’s financial interests, the Agency may offset before the payment date specified in the debit note;

(b) by **drawing on the Guarantee Fund**. The Agency or the Commission will formally notify the beneficiary the debit note on behalf of the Guarantee Fund and recover the amount:

- (i) not applicable;
- (ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the date for payment in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

ARTICLE 45 — ADMINISTRATIVE AND FINANCIAL PENALTIES

45.1 Conditions

Under Articles 109 and 131(4) of the Financial Regulation No 966/2012, the Agency may impose **administrative** and **financial penalties** if the beneficiary:

- (a) has committed substantial errors, irregularities or fraud or is in serious breach of its obligations under the Agreement or
- (b) has made false declarations about information required under the Agreement or for the submission of the proposal (or has not supplied such information).

Under Article 109(3) of the Financial Regulation No 966/2012, the Agency or the Commission may — under certain conditions and limits — publish decisions imposing administrative or financial penalties.

45.2 Duration — Amount of penalty — Calculation

Administrative penalties exclude the beneficiary from all contracts and grants financed from the EU or Euratom budget for a maximum of five years from the date the infringement is established by the Agency.

If the beneficiary commits another infringement within five years of the date the first infringement is established, the Agency may extend the exclusion period up to 10 years.

Financial penalties will be between 2% and 10% of the maximum EU contribution in the estimated budget (see Annex 2).

If the beneficiary commits another infringement within five years of the date the first infringement is established, the Agency may increase the rate of financial penalties to between 4% and 20%.

45.3 Procedure

Before applying a penalty, the Agency will formally notify the beneficiary:

- informing it of its intention to impose a penalty, its duration or amount and the reasons why and
- inviting it to submit observations within 30 days.

If the Agency does not receive any observations or decides to impose the penalty despite of observations it has received, it will formally notify **confirmation** of the penalty to the beneficiary and — in case of financial penalties — deduct the penalty from the payment of the balance or formally notify a **debit note**, specifying the amount to be recovered, the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Agency or the Commission may **recover** the amount:

- (a) by ‘**offsetting**’ it — without the beneficiary’s consent — against any amounts owed to the beneficiary by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU’s financial interests, the Agency may offset before the payment date in the debit note;

- (b) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

SECTION 2 LIABILITY FOR DAMAGES

ARTICLE 46 — LIABILITY FOR DAMAGES

46.1 Liability of the Agency

The Agency cannot be held liable for any damage caused to the beneficiary (or to third parties) as a consequence of implementing the Agreement, including for gross negligence.

The Agency cannot be held liable for any damage caused by the beneficiary or third parties involved in the action, as a consequence on implementing the Agreement.

46.2 Liability of the beneficiary

46.2.1 Conditions

Except in case of force majeure (see Article 51), the beneficiary must compensate the Agency for any damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement.

46.2.2 Amount of damages - Calculation

The amount the Agency can claim from the beneficiary will correspond to the damage caused by that beneficiary.

46.2.3 Procedure

Before claiming damages, the Agency will formally notify the beneficiary:

- informing it of its intention to claim damages, the amount and the reasons why and
- inviting it to submit observations within 30 days.

If the Agency does not receive any observations or decides to claim damages despite the observations it has received, it will formally notify **confirmation** of the claim for damages and a **debit note**, specifying the amount to be recovered, the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Agency or the Commission may **recover** the amount:

- (a) by '**offsetting**' it — without the beneficiary's consent — against any amounts owed to the beneficiary by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the Agency may offset before the payment date specified in the debit note;

- (b) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

SECTION 3 SUSPENSION AND TERMINATION

ARTICLE 47 — SUSPENSION OF PAYMENT DEADLINE

47.1 Conditions

The Agency may — at any moment — suspend the payment deadline (see Article 21.2 to 21.4) if a request for payment (see Article 20) cannot be approved because:

- (a) it does not comply with the provisions of the Agreement (see Article 20);
- (b) the technical or financial report has not been submitted or is not complete or additional information is needed, or
- (c) there is doubt about the eligibility of the costs declared in the financial statement and additional checks, reviews, audits or investigations are necessary.

47.2 Procedure

The Agency will formally notify the beneficiary of the suspension and the reasons why.

The suspension will **take effect** the day notification is sent by the Agency (see Article 52).

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted** — and the remaining period will resume.

If the suspension exceeds two months, the beneficiary may request the Agency if the suspension will continue.

If the payment deadline has been suspended due to the non-compliance of the technical or financial report (see Article 20) and the revised report or statement is not submitted or was submitted but is also rejected, the Agency may also terminate the Agreement (see Article 50.3.1(I)).

ARTICLE 48 — SUSPENSION OF PAYMENTS

48.1 Conditions

The Agency may — at any moment — suspend, in whole or in part, the pre-financing payment or the payment of the balance, if the beneficiary:

- (a) has committed or is suspected of having committed substantial errors, irregularities, fraud or serious breach of obligations in the award procedure or under this Agreement or
- (b) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2).

48.2 Procedure

Before suspending payments, the Agency will formally notify the beneficiary

- informing it of its intention to suspend payments and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the suspension procedure is not continued.

The suspension will **take effect** the day the confirmation notification is sent by the Agency.

If the conditions for resuming payments are met, the suspension will be **lifted**. The Agency will formally notify the beneficiary

The beneficiary may suspend implementation of the action (see Article 49.1) or terminate the Agreement (see Article 50.1 and 50.2).

ARTICLE 49 — SUSPENSION OF THE ACTION IMPLEMENTATION

49.1 Suspension of the action implementation, by the beneficiary

49.1.1 Conditions

The beneficiary may suspend implementation of the action or any part of it, if exceptional circumstances — in particular *force majeure* (see Article 51) — make implementation impossible or excessively difficult.

49.1.2 Procedure

The beneficiary must immediately formally notify to the Agency the suspension (see Article 52), stating:

- the reasons why and
- the expected date of resumption.

The suspension will **take effect** the day this notification is received by the Agency.

Once circumstances allow for implementation to resume, the beneficiary must immediately formally notify the Agency and request an **amendment** of the Agreement to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement has been terminated (see Article 50).

The suspension will be **lifted** with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension of the action implementation are not eligible (see Article 6).

49.2 Suspension of the action implementation, by the Agency

49.2.1 Conditions

The Agency may suspend implementation of the action or any part of it:

- (a) if the beneficiary has committed or is suspected of having committed substantial errors, irregularities, fraud or serious breach of obligations in the award procedure or under this Agreement;

(b) if the beneficiary has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2), or

(c) if the action is suspected of having lost its scientific or technological relevance.

49.2.2 Procedure

Before suspending implementation of the action, the Agency will formally notify the beneficiary:

- informing it of its intention to suspend the implementation and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the procedure is not continued.

The suspension will **take effect** five days after confirmation notification is received by the beneficiary (or on a later date specified in the notification).

It will be **lifted** if the conditions for resuming implementation of the action are met.

The beneficiary will be formally notified of the lifting and the Agreement will be **amended** to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement has already been terminated (see Article 50).

The suspension will be lifted with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension are not eligible (see Article 6).

The beneficiary may not claim damages due to suspension by the Agency (see Article 46).

Suspension of the action implementation does not affect the Agency's right to terminate the Agreement (see Article 50), reduce the grant or recover amounts unduly paid (see Articles 43 and 44).

ARTICLE 50 — TERMINATION OF THE AGREEMENT

50.1 Termination of the Agreement by the beneficiary

50.1.1 Conditions and procedure

The beneficiary may terminate the Agreement.

The beneficiary must formally notify termination to the Agency (see Article 52), stating:

- the reasons why and
- the date the termination will take effect. This date must be after the notification.

If no reasons are given or if the Agency considers the reasons do not justify termination, the Agreement will be considered to have been ‘**terminated improperly**’.

The termination will **take effect** on the day specified in the notification.

50.1.2 Effects

The beneficiary must submit — within 60 days from when termination takes effect — the final report (see Article 20).

If the Agency does not receive the report within the deadline (see above), no costs will be reimbursed.

The Agency will **calculate the final grant amount** (see Article 5.3) and the balance (see Article 21), on the basis of the report submitted, the eligible costs and compliance with other obligations under the Agreement.

In case of **improper termination**, the grant will be reduced by 100% (see Article 43).

50.2 Termination of the participation of one or more beneficiaries, by the beneficiaries

Not applicable

50.3 Termination of the Agreement, by the Agency

50.3.1 Conditions

The Agency may terminate the Agreement, if:

- (a) not applicable;
- (b) a change to the beneficiary's legal, financial, technical, organisational or ownership situation is likely to substantially affect or delay the implementation of the action or calls into question the decision to award the grant;
- (c) not applicable;
- (d) implementation of the action is prevented by force majeure (see Article 51) or suspended by the beneficiary (see Article 49.1) and either:
 - (i) resumption is impossible, or
 - (ii) the necessary changes to the Agreement would call into question the decision awarding the grant or breach the principle of equal treatment of applicants;
- (e) the beneficiary is declared bankrupt, being wound up, having its affairs administered by the courts, has entered into an arrangement with creditors, has suspended business activities, or is subject to any other similar proceedings or procedures under national law;
- (f) the beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has been found guilty of professional misconduct, proven by any means;
- (g) the beneficiary does not comply with the applicable national law on taxes and social security;

- (h) the action has lost scientific or technological relevance;
- (i) *not applicable*;
- (j) *not applicable*;
- (k) the beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed fraud, corruption, or is involved in a criminal organisation, money laundering or any other illegal activity affecting the EU's financial interests;
- (l) the beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has — in the award procedure or under the Agreement — committed:
 - (i) substantial errors, irregularities, fraud or
 - (ii) serious breach of obligations, including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles;
- (m) the beneficiary has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**'extension of findings from other grants to this grant'**).

50.3.2 Procedure

Before terminating the Agreement, the Agency will formally notify the beneficiary:

- informing it of its intention to terminate and the reasons why and
- inviting it, within 30 days of receiving notification, to submit observations and — in case of Point (l.ii) above — to inform the Agency of the measures to ensure compliance with the obligations under the Agreement.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify to the beneficiary **confirmation** of the termination and the date it will take effect. Otherwise, it will formally notify that the procedure is not continued.

The termination will **take effect**:

- for terminations under Points (b), (e), (g), (h), (j), and (l.ii) above: on the day specified in the notification of the confirmation (see above);
- for terminations under Points (d), (f), (i), (k), (l.i) and (m) above: on the day after the notification of the confirmation is received by the beneficiary.

50.3.3 Effects

The beneficiary must — within 60 days from when termination takes effect — submit the final report (see Article 20).

If the Agency does not receive the report within the deadline (see above), no costs will be reimbursed.

The Agency will calculate the final grant amount (see Article 5.3) and the balance (see Article 21), on the basis of the report submitted, the eligible costs and compliance with other obligations under the Agreement.

This does not affect the Agency's right to reduce the grant (see Article 43) or to impose administrative and financial penalties (Article 45).

The beneficiaries may not claim damages due to termination by the Agency (see Article 46).

SECTION 4 FORCE MAJEURE

ARTICLE 51 — FORCE MAJEURE

‘Force majeure’ means any situation or event that:

- prevents either party from fulfilling their obligations under the Agreement,
- was unforeseeable, exceptional situation and beyond the parties’ control,
- was not due to error or negligence on their part (or on the part of third parties involved in the action), and
- proves to be inevitable in spite of exercising all due diligence.

The following cannot be invoked as force majeure:

- any default of a service, defect in equipment or material or delays in making them available, unless they stem directly from a relevant case of force majeure,
- labour disputes or strikes, or
- financial difficulties.

Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects.

The parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible.

The party prevented by force majeure from fulfilling its obligations under the Agreement cannot be considered in breach of them.

CHAPTER 7 FINAL PROVISIONS

ARTICLE 52 — COMMUNICATION BETWEEN THE PARTIES

52.1 Form and means of communication

Communication under the Agreement (information, requests, submissions, ‘formal notifications’, etc.) must:

- be made in writing and
- bear the number of the Agreement.

Until the payment of the balance: all communication must be made through the electronic exchange system and using the forms and templates provided there.

After the payment of the balance: formal notifications must be made by registered post with proof of delivery ('formal notification on paper').

Communications in the electronic exchange system must be made by persons authorised according to the 'Terms and Conditions of Use of the electronic exchange system'. For naming the authorised persons, the beneficiary must have designated — before the signature of this Agreement — a 'Legal Entity Appointed Representative (LEAR)'. The role and tasks of the LEAR are stipulated in his/her appointment letter (see Terms and Conditions of Use of the electronic exchange system).

If the electronic exchange system is temporarily unavailable, instructions will be given on the Agency and the Commission websites.

52.2 Date of communication

Communications are considered to have been made when they are sent by the sending party (i.e. on the date and time they are sent through the electronic exchange system).

Formal notifications through the **electronic** exchange system are considered to have been made when they are received by the receiving party (i.e. on the date and time of acceptance by the receiving party, as indicated by the time stamp). A formal notification that has not been accepted within 10 days after sending is considered to have been accepted.

Formal notifications **on paper** sent by **registered post** with proof of delivery (only after the payment of the balance) are considered to have been made on either:

- the delivery date registered by the postal service or
- the deadline for collection at the post office.

If the electronic exchange system is temporarily unavailable, the sending party cannot be considered in breach of its obligation to send a communication within a specified deadline.

52.3 Addresses for communication

The **electronic** exchange system must be accessed via the following URL:

<https://ec.europa.eu/research/participants/portal/desktop/en/projects/>

The Agency will formally notify the beneficiary in advance any changes to this URL.

Formal notifications on paper (only after the payment of the balance) addressed **to the Agency** must be sent to the following address:

*Executive Agency for Small and Medium-sized Enterprises (EASME)
H2020 SME
COV2 03/090
B-1049 Brussels Belgium*

Formal notifications on paper (only after the payment of the balance) addressed **to the beneficiary** must be sent to its legal address as specified in the Beneficiary Register (in the electronic exchange system).

ARTICLE 53 — INTERPRETATION OF THE AGREEMENT

53.1 Precedence of the Terms and Conditions over the Annexes

The provisions in the Terms and Conditions of the Agreement take precedence over its Annexes.

Annex 2 takes precedence over Annex 1.

53.2 Privileges and immunities

Not applicable

ARTICLE 54 — CALCULATION OF PERIODS, DATES AND DEADLINES

In accordance with Regulation No 1182/71⁶, periods expressed in days, months or years are calculated from the moment the triggering event occurs.

The day during which that event occurs is not considered as falling within the period.

ARTICLE 55 — AMENDMENTS TO THE AGREEMENT

55.1 Conditions

The Agreement may be amended, unless the amendment entails changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

Amendments may be requested by any of the parties.

55.2 Procedure

The party requesting an amendment must submit a request for amendment signed in the electronic exchange system (see Article 52).

The request for amendment must include:

- the reasons why;
- the appropriate supporting documents.

⁶ Regulation (EEC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time-limits (OJ L 124, 8.6.1971, p. 1).

The Agency may request additional information.

If the party receiving the request agrees, it must sign the amendment in the electronic exchange system within 45 days of receiving notification (or any additional information the Agency has requested). If it does not agree, it must formally notify its disagreement within the same deadline. The deadline may be extended, if necessary for the assessment of the request. If no notification is received within the deadline, the request is considered to have been rejected

An amendment **enters into force** on the day of the signature of the receiving party.

An amendment **takes effect** on the date agreed by the parties or, in the absence of such an agreement, on the date on which the amendment enters into force.

ARTICLE 56 — ACCESSION TO THE AGREEMENT

Not applicable

ARTICLE 57 — APPLICABLE LAW AND SETTLEMENT OF DISPUTES

57.1 Applicable law

The Agreement is governed by the applicable EU law, supplemented, if necessary by the law of Belgium.

57.2 Dispute settlement

If a dispute concerning the interpretation, application or validity of the Agreement cannot be settled amicably, the General Court — or, on appeal, the Court of Justice of the European Union — has sole jurisdiction. Such actions must be brought under Article 272 of the Treaty on the Functioning of the EU (TFEU).

If a dispute concerns administrative or financial penalties, offsetting or an enforceable decision under Article 299 TFEU (see Articles 44, 45 and 46), the beneficiary must bring action before the General Court — or, on appeal, the Court of Justice of the European Union — under Article 263 TFEU. Actions against enforceable decisions must be brought against the Commission (not against the Agency).

ARTICLE 58 — ENTRY INTO FORCE OF THE AGREEMENT

The Agreement will enter into force on the day of signature by the Agency or the beneficiary, depending on which is later.

SIGNATURES

For the beneficiary

For the Agency



EUROPEAN COMMISSION
Executive Agency for Small and Medium-sized Enterprises
(EASME)
H2020 SME



ANNEX 1 (part A)

SME instrument phase 1

NUMBER — 734959 — GASFARM

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1.1. The project summary

Project Number ¹	734959	Project Acronym ²	GASFARM
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One form per project

General information

Project title ³	SMALL-SCALE ANAEROBIC DIGESTION FOR AFFORDABLE, EFFICIENT AND SUSTAINABLE MANAGEMENT OF FARMS WASTE
Starting date ⁴	01/09/2016
Duration in months ⁵	4
Call (part) identifier ⁶	H2020-SMEINST-1-2016-2017
Topic	SMEInst-09-2016-2017 Stimulating the innovation potential of SMEs for a low carbon and efficient energy system
Fixed EC Keywords	
Free keywords	Anaerobic digestion, biogas, small farms, animal waste, waste management, chemical fertilizers, pig slurry, pig manure, anaerobic digester, small and medium farms, SMF

Abstract ⁷

Sereco Biotest S.N.C. is an Italian company leader in the field of advanced environmental services. They are specialised providers of fore-front R&D solutions in the environmental technology and industrial ecology fields. This eagerness to find innovative and efficient industry solutions whilst protecting the environment has resulted in the development of GASFARM, a small-size anaerobic digester based on Anaerobic Baffled Reactor technology. GASFARM will be used by small and medium farms (SMFs) from livestock and agricultural industry, currently unable to manage their residues affordably.

This novel anaerobic digester is techno efficient, as it is optimized and adapted to small companies' performance and cost requirements. It allows on-site waste treatment avoiding transportation costs and civil engineering, while recovering valuable resources like biogas or nutrients (N, P).

The small-scale anaerobic digester has several technical advantages which overcome the technique barriers that have prevented anaerobic digestion to be successful among small agricultural enterprises. This solution requires far less reaction volumes compared to ordinary Continuous Stirred-Tank Reactors (CSTR), decreases in 50-70% the use of chemical fertilizers, has higher efficiency performance rates and it is easy to install, transport and handle reducing costs. Therefore, the adoption of this small scale anaerobic baffled reactor will become biogas plants a matter of industrial production rather than customized engineering, making the whole process much more profitable.

1.2. List of Beneficiaries

Project Number ¹	734959	Project Acronym ²	GASFARM
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List of Beneficiaries

No	Name	Short name	Country	Project entry month ⁸	Project exit month
1	SERECO BIOTEST SNC DI LUCA POLETTI	Sereco	Italy	1	4

1.3. Workplan Tables - Detailed implementation

1.3.1. WT1 List of work packages

WP Number ⁹	WP Title	Lead beneficiary ¹⁰	Start month ₁₂	End month ₁₃
WP1	FEASIBILITY STUDY	1 - Sereco	1	4

1.3.2. WT2 list of deliverables

Deliverable Number ¹⁴	Deliverable Title	WP number ⁹	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D1.1	Feasibility Study	WP1	1 - Sereco	Report	Confidential, only for members of the consortium (including the Commission Services)	4

1.3.3. WT3 Work package descriptions

Work package number ⁹	WP1	Lead beneficiary ¹⁰	1 - Sereco
Work package title	FEASIBILITY STUDY		
Start month	1	End month	4

Objectives

This Work Package aims to demonstrate the value and validity of GASFARM project, based on a practical and comprehensive overall view of the proposed business concept. In this respect, SerecoBiotest will undertake this study to assess 3 main aspects: Technical feasibility of the technology, Commercial potential and Financial viability; and will also produce a Business Plan for GASFARM project.

Description of work and role of partners

WP1 - FEASIBILITY STUDY [Months: 1-4]
Sereco
TASK 1: Technical feasibility & Project Execution Plan. Month 1 to Month 3 — Task Leader: Dr. Roberto Poletti
 Including a comprehensive description of GASFARM technology and its uses:
 1. Detailed Bill of Material and Failure Modes and Effects Analysis (system/design/process) to control costs and risks by identifying potential areas of concern in the system lifecycle (e.g. operation, maintenance).
 2. Potential end-users will be contacted (small-medium size pig farms primarily, and other small-medium livestock and crops farms, secondarily) for the subsequent industrial testing of GASFARM prototype in a Phase 2, also facilitating routes for the product commercialisation.
 3. Technology watch analysis will be deepened, along with the development of a list with all technical regulations and standards to be fulfilled. The Project Execution Plan, resources, budget and time schedule required for the realization of the GASFARM project (Phase 2) will be derived from these activities.
TASK 2: Commercial potential. Month 1 to Month 3 — Task Leader: Dr. Luca Poletti
 Assessment of project commercial viability through analysis of the targeted markets: quantification of the markets (crops and live-stocks farms) and customer segments per country, including forecast growth projection, pricings and competition (direct/indirect competitors, barriers):
 1. Consolidation of the supply chain to further optimise the final product cost. Partners' search for potential national and international partners to participate in the manufacturing and distribution of the final product.
 2. Market strategy: Using the market analysis develop key aspects for the product launch, including evaluation of new commercial routes to access new markets, i.e. pricing policy, advertising and promotion strategy (per country/market). This will contribute to define the future positioning of GASFARM on the targeted markets. The FTO analysis and IP strategy (exploitation/monitoring/enforcement) between SerecoBiotest and other AD and ABR manufacturers or distributors previously performed will be deepen.
TASK 3: Financial viability. Month 1 to Month 3 — Task Leader: Dr. Chiara Biscarini
 The purpose of this task is to ensure the financial viability of GASFARM by establishing its complete business model: evaluation of GASFARM's projections of revenues, costs, viability margin, cash flow, Break-Even and ROI for the first 5 years. Manufacturing costs will be examined in depth, including projections on how these costs are going to decrease, including profit margin, costs of transport, etc.
 This task will also include a search for additional funding sources and investors to secure Phase 2 development.
TASK 4: Preparation of Business Plan. Month 3 to Month 4 — Task Leader: Dr. Luca Poletti
 The outcomes of the technical, commercial and financial studies (Tasks 1/2/3) will be used to prepare a Business Plan. In particular, the Business Plan will include a detailed SWOT analysis (of the business and the business' competitors) and a Critical Risk Factors analysis.

Participation per Partner

Partner number and short name ¹⁰
1 - Sereco

List of deliverables

Deliverable Number ¹⁴	Deliverable Title	Lead beneficiary	Type ¹⁵	Dissemination level ¹⁶	Due Date (in months) ¹⁷
D1.1	Feasibility Study	1 - Sereco	Report	Confidential, only for members of the consortium (including the Commission Services)	4

Description of deliverables

Feasibility report, including a Business plan: This report will be divided in 3 main sections: The 1st section will describe GASFARM technology, associated risks, costs and schedule for its development and industrial testing. All the details will be summarised in a Project Execution Plan. The 2nd section will focus on its marketability through an in-depth survey of the target markets and its supply chain. The marketing strategy, derived from the previous work, will be presented, with the initial IP and IPR management plan. The 3rd section will include the business model and the projections (revenues/costs). Month of delivery: Month 4

D1.1 : Feasibility Study [4]

Feasibility report, including a Business plan: This report will be divided in 3 main sections: The 1st section will describe GASFARM technology, associated risks, costs and schedule for its development and industrial testing. All the details will be summarised in a Project Execution Plan. The 2nd section will focus on its marketability through an in-depth survey of the target markets and its supply chain. The marketing strategy, derived from the previous work, will be presented, with the initial IP and IPR management plan. The 3rd section will include the business model and the projections (revenues/costs). Month of delivery: Month 4

Schedule of relevant Milestones

Milestone number ¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
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1.3.4. WT4 List of milestones

No milestones indicated

1.3.5. WT5 Critical Implementation risks and mitigation actions

No risks indicated

1.3.6. *WT6 Summary of project effort contribution*

1 - Sereco	WP1
	✓

1.3.7. WT7 Tentative schedule of project reviews

No project reviews indicated

1. Project number

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

2. Project acronym

Use the project acronym as given in the submitted proposal. It can generally not be changed. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

3. Project title

Use the title (preferably no longer than 200 characters) as indicated in the submitted proposal. Minor corrections are possible if agreed during the preparation of the grant agreement.

4. Starting date

Unless a specific (fixed) starting date is duly justified and agreed upon during the preparation of the Grant Agreement, the project will start on the first day of the month following the entry into force of the Grant Agreement (NB : entry into force = signature by the Commission). Please note that if a fixed starting date is used, you will be required to provide a written justification.

5. Duration

Insert the duration of the project in full months.

6. Call (part) identifier

The Call (part) identifier is the reference number given in the call or part of the call you were addressing, as indicated in the publication of the call in the Official Journal of the European Union. You have to use the identifier given by the Commission in the letter inviting to prepare the grant agreement.

7. Abstract

8. Project Entry Month

The month at which the participant joined the consortium, month 1 marking the start date of the project, and all other start dates being relative to this start date.

9. Work Package number

Work package number: WP1, WP2, WP3, ..., WPn

10. Lead beneficiary

This must be one of the beneficiaries in the grant (not a third party) - Number of the beneficiary leading the work in this work package

11. Person-months per work package

The total number of person-months allocated to each work package.

12. Start month

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

13. End month

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

14. Deliverable number

Deliverable numbers: D1 - Dn

15. Type

Please indicate the type of the deliverable using one of the following codes:

R	Document, report
DEM	Demonstrator, pilot, prototype
DEC	Websites, patent filings, videos, etc.
OTHER	
ETHICS	Ethics requirement

16. Dissemination level

Please indicate the dissemination level using one of the following codes:

PU Public
CO Confidential, only for members of the consortium (including the Commission Services)
EU-RES Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)
EU-CON Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)
EU-SEC Classified Information: SECRET UE (Commission Decision 2005/444/EC)

17. Delivery date for Deliverable

Month in which the deliverables will be available, month 1 marking the start date of the project, and all delivery dates being relative to this start date.

18. Milestone number

Milestone number: MS1, MS2, ..., MSn

19. Review number

Review number: RV1, RV2, ..., RVn

20. Installation Number

Number progressively the installations of a same infrastructure. An installation is a part of an infrastructure that could be used independently from the rest.

21. Installation country

Code of the country where the installation is located or IO if the access provider (the beneficiary or linked third party) is an international organization, an ERIC or a similar legal entity.

22. Type of access

VA if virtual access,
TA-uc if trans-national access with access costs declared on the basis of unit cost,
TA-ac if trans-national access with access costs declared as actual costs, and
TA-cb if trans-national access with access costs declared as a combination of actual costs and costs on the basis of unit cost.

23. Access costs

Cost of the access provided under the project. For virtual access fill only the second column. For trans-national access fill one of the two columns or both according to the way access costs are declared. Trans-national access costs on the basis of unit cost will result from the unit cost by the quantity of access to be provided.

HISTORY OF CHANGES

CHANGES	DESCRIPTION
NO CHANGES WERE MADE	

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1. EXCELLENCE

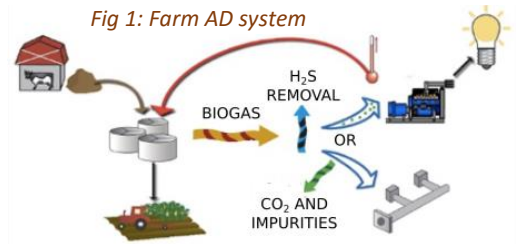
1.1 OBJECTIVES

With over 40 years of experience SerecoBiotest S.N.C has become a leader in the field of advanced environmental services in Italy. We are natural pioneers specialised providers of fore-front R&D solutions in the environmental technology and industrial ecology fields. This eagerness to find innovative and efficient industry solutions whilst protecting the environment has resulted in the development of GASFARM, a **small-size anaerobic digester based on Anaerobic Baffled Reactor (ABR) technology**. GASFARM will be used by small and medium farms (SMFs) from livestock and agricultural industry, currently unable to manage their residues affordably.

BACKGROUND AND CURRENT NEEDS OF THE AGRICULTURE AND AGRO-ZOOTECNICAL INDUSTRY

Globally, farm animals produce 13 billion tonnes of waste per year¹ (with a rough estimate of dry weight manure of 1.7 billion tonnes). In order to comply with Directive on Urban Wastewater (Directive 91/271/EEC), local SMFs usually build a common treatment plant financed between all of them, and subcontract the exploitation and maintenance. This results in an average fee of 80,000€/year/SME for their wastes treatment. Considering that gross farm annual revenues vary from 10.000-100.000€ in small farms, and 100.000-250.000€ in medium farms, this fee becomes an unaffordable cost for these farms.

Anaerobic Digestion (AD) technology has proven a great option to treat agro-zootecnical wastes. AD digester processes organic waste while producing biogas by fermentation of biomass in the absence of oxygen. The biogas generated can then be sent to a combined heat & power (CHP) plant to produce power and steam which can be used in the farm or sold to the public power supply. AD also generates a digestate that can be used as a fertilizer or for land spreading. Moreover, AD is one of the best available techniques to reduce ammonia, methane and organic acid air emissions from farm activities such as pig housing². However, **AD is currently not a viable solution for SMFs as it requires a larger quantity of feedstock for a correct functioning and optimal performance in electricity production³, being only commercialised at large scale (> 100-300 kWe).**



OUR INNOVATIVE SOLUTION: WHY IS IT VIABLE FOR SMFs?

With GASFARM we propose a technology that is capable of extending AD to SMFs, based on ABR technology. GASFARM is a multi-chamber reactor that allows a longitudinal separation and distribution of the different reactions (hydrolysis, acidogenesis and methanogenesis) that occur during biogasification. Our reactor reduces the reactor volume 4x times, improve the hydrolysis, acidogenic, acetogenic and methanogenic yield, protects against toxic materials and provide higher resistance to changes in operational parameters, making AD technology suitable for SMFs. GASFARM technology will be delivered from the manufacturing facilities directly to the farm site by road transport, avoiding as such the costly construction works that characterize the setup of the classical *continues stirred-tank reactor* (CSTR)-based AD plants. The serial industrial production of the ABR reactor will shrink the overall investment costs of the AD plants with respect to the market dominant CSTR unfit for small installations.

- GASFARM farmer's advantages:**
- **Affordable** treatment: ROI 30%
 - Valorisation residues: **↑revenues**
 - On-site energy generation: **↓cost**
 - **↓50-70%** use chemical fertilisers
 - **Flexibility** AD waste sources
 - **Easy** to install, transport & handle
 - **Green energy incentives maximised**

GASFARM is a modular system easily adaptable to increases in production capacities and new materials (e.g. from surrounding farms). Connected to a CHP unit, farms will generate additional revenues from the valorisation of digestate and energy recovered for self-supply or sold to the grid, with 13,500€-365,000€ annual revenues (depending on farm size). Furthermore, GASFARM will contribute to protect SMFs against current trend towards concentration in larger farms and specialised regions, i.e., economy of scale and agglomeration, by increasing their self-sufficiency and favouring business profitability.

GASFARM COMMERCIAL AND TECHNICAL OBJECTIVES

- | | |
|-------------------|--|
| COMMERCIAL | <ul style="list-style-type: none"> - To strengthen the commercial strategy of agricultural and agro-zootecnical companies, guaranteeing the widest distribution of GASFARM within these sectors. - To involve key stakeholders within the European waste (FEAD, ISWA) and renewable energies industry (CEWEP, EBA) tapping into the waste-to-energy strategy. - To ensure a strategic protection of the new results generated. - To guarantee a price reduction per unit/year (since 1st year commercialisation) of at least 5% |
|-------------------|--|

¹ The detrimental impacts of industrial animal agriculture. CWF Trust
² [Best Available Techniques \(BAT\) Reference Document for the Intensive Rearing of Poultry and Pigs](#)
³ Silverstein K. The appeal of animal waste. EnergyBiz Insider. 2007. 10 August.

TECHNICAL

- To design, manufacture and test an industrial small scale anaerobic baffled reactor of 63kWe.
- To test during 3,600 hours, optimise and validate the up-scaled reactor
- To define the operating parameters (SRT, HRT, reaction volume) that optimise the valorisation and production of biogas with manures and/or crop waste.

THE FEASIBILITY STUDY IN PHASE 1 WILL HAVE THE FOLLOWING OBJECTIVES:

- ❖ Definition of the **manufacturing/operating requirements**, evaluation of the physical development (planning and costs) and risks. The Project Execution Plan will be derived from this technical viability.
- ❖ Assessment of **commercial viability**, including analysis of the targeted markets, the competition environment and consolidation of the future supply chain and definition of the marketing strategy (e.g. prices, advertising).
- ❖ Demonstration of **financial viability**: consolidation of the business model and pricing, projection of annual revenues/costs/margin, Break-Even and Return on Investment and assessment of funding sources (private/public sectors, loans, etc.); and development of project business plan, including a SWOT and Critical Risk Factors analysis.

1.2 RELATION TO THE WORK PROGRAMME

GASFARM fits perfectly to the work programme: *SMEInst-09-2016-2017: Stimulating the innovation potential of SMEs for a low carbon and efficient energy system*. Our innovative project will develop a novel small scale anaerobic baffled reactor that will allow converting small agricultural and livestock farms wastes in an alternative and sustainable fuel such as biogas. Furthermore, our technology will allow farmers to produce a natural fertiliser, i.e., digestate, avoiding or reducing as such the use of contaminant chemical products. Therefore, GASFARM will reduce energy consumption and carbon footprint of this industry through an affordable, low-carbon and energy-efficient technology.

1.3 CONCEPT AND METHODOLOGY

a) Concept

With GASFARM, we will provide small and medium scale agricultural and agro-zootechnical industry with a **reliable and affordable technological solution for their waste management**. GASFARM digester is based on ABR

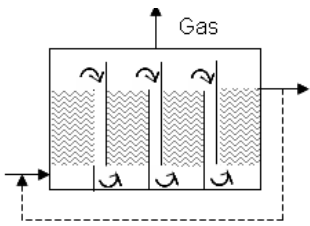


Fig 2: Anaerobic Baffled Reactor

technology. The ABR multi-chamber geometry favours the separation and longitudinal distribution along the reactor pathway of the different biogasification reactions: hydrolysis, acidification, acetogenesis, and methanogenesis. Biomass is gradually distributed in different chambers as a result of hydraulic pressure. This separation allows specialised microbial consortia be devoted to a specific reaction step which enhances the overall biogasification yields. Moreover, the first ABR chamber acts as a “buffer” capable of retaining the possible inlets of inhibitors, toxics as well as organic overloading, thus, saving the homeostasis of the remaining AD phases. Specific piping connection between the chambers makes it possible to carry out different hydraulic pathways (recirculation, emptying, loading) among different chambers in order to re-establish homeostatic conditions within the reactor.

The AD reaction produces **BIOGAS** (60-75% CH₄ and 25-40% CO₂) and fermented **DIGESTATE**:

- Biogas can be used to generate renewable energy using a **CHP plant**. The CH₄, 21 times more powerful greenhouse effect than CO₂, would otherwise be released into the atmosphere. Power generation and/or biomethane production in small farms is generally lower than 100kWe and 50 Nm³/h respectively, the thresholds below which incentives in many EU countries (e.g. Italy or Germany) are maximised.
- ABR digester **separates the solid and liquid phases** inside the reactor: within each chamber the solids sediment and can be pumped off through a dedicated hydraulic line. The last ABR reaction chamber is equipped with a sedimentation section that allows a further liquid-solid separation of the digestate. The effluent has a very low concentration of suspended solids so the phases separate without a device (centrifuge), i.e., significant economic saving and simplified operational management. The solid part can be used as a fertilizer in own lands or sold externally, while the liquid fraction can be partly recirculated (about 2%) or used for fertigation.



Fig 3: CHP plant



Fig 4: Manure digestate

CURRENT STAGE OF DEVELOPMENT

GASFARM has been developed in different stages:

1. **Identification of the need:** Due to the high concentration of organic pollutants in farming process wastewaters, even small companies need to treat their effluents under their own responsibility and costs (article 13 of Directive 91/271/EEC on urban wastewater). However, current AD solutions are only viable for great volumes of feedstocks. SMFs must pay a high annual fee for their waste management (average 80,000€). In addition, SMFs have difficult access to cost-effective and high efficiency renewable energy waste recovery technologies.

2. **Search for market solutions:** Once confirmed the need for an affordable small scale waste treatment solution, and knowing that AD is the most suited technology, we conducted further research of solutions available using the same technology. Moreover, in order to understand the need fully, we engaged with different end users, i.e., small and medium farms from livestock and local and international agro-industrial experts.
3. **Strategic alliances:** Out of this engagement, we have explored potential alliances with end users, research centres and complementary technology providers. For instance, *Sánchez Romero Carvajal S.A.* and *Gestión Agropecuaria de Montanera S.L.* (Spanish end users from the pig farm industry); *Azienda Agricola Frantoio Peltristo* (Italian olive oil producer) and the *Department of Chemistry, Biology and Biotechnology of the University of Perugia* and the *University of Camerino* (Italy), have shown great interest (see letters of interest in Section 4). We have also been engaging with energy-recovery/cogeneration technology providers for testing purposes and to assess integration options with GASFARM.
4. **Design of technology and initial testing:** Since 2012 we have been working on the design of a small scale AD solution. Initially, we explored the down-scale of a CSTR; however investment costs were too high due to the high reaction volumes required. For that reason, we explored ABR technology as it allows lower volumes as dimensioning is based on solid volume only. This work resulted on the development of a small-size ABR prototype (1:180 scale) to obtain 3kWe electric power, with the following characteristics:
 - Length (mm): 2400 - Geometric height (mm): 500 - Geometric volume (L): 600
 - Wideness (mm): 500 - Usable height (hydraulic)(mm): 440 - Usable volume (hydraulic) (L): 528

Our prototype has been tested with silage and has given satisfactory results. 2 testing runs with 2 cycles of full assessment of biogas productivity and of hydraulic retention time (HRT) and solid retention time (SRT) were accomplished. The test showed an average theoretical SRT of 24.3 days, much lower than the HRT value of 40-45 days in CSTR-type reactors (it must be noted that SRT and HRT virtually coincide in CSTR reactors, whereas in ABR reactors are separated, with a typical HRT of 3-4 days. This is because in ABR water is a vehicle for the solids bound to subsequently settle in the bottom of the chamber whereas in CSTR solids flow in and out of the reactor alongside water which prevents a full exploitation of the solids biogasification potential). Therefore, **Technology Readiness Level (TRL) 6** has been achieved.



Fig 5: GASFARM prototype

b) methodology

Our objective is to bring GASFARM from **TRL6-7 to TRL9** “final technology system proven through successful implementation”, scaling up our prototype for an electric power of 63kWe. We have estimated that this power is achieved with a daily load of 10m³ of cattle manure and 2.6 ton of corn silage, a very low biomass consumption.



Fig 6: Rendering plant

Once we have demonstrated the project feasibility through this Phase 1, we will perform the full project implementation in a H2020 Phase 2, which comprises the following technical and commercial steps:

TECHNICAL ACTIVITIES: (1) Up-scaling design of current prototype from 3kWe to 63kWe (TRL 6-7); (2) Industrial pilot plant engineering and manufacture (TRL 7); (3) Factory and Performance tests with the full scale prototype during a representative period of time of at least 3,600 hours (TRL 8); (4) Define control parameters and operational performance verification with the industrial pilot during a minimum period of 1 year (TRL 8); (5) Life Cycle Analysis (TRL 8) and (6) GASFARM validation and commercialisation (TRL 9).

COMMERCIAL ACTIVITIES: (1) Commercialization activities related with new markets penetration, demonstration workshops, identification of key industrial partners and commercialisation and exploitation strategy for GASFARM; (2) Obtain GASFARM’s Certification; (3) Communication & Dissemination activities; (4) Commercialization Plan.

EUROPEAN DIMENSION OF GASFARM PROJECT

- *Directive on urban wastewater (Directive 91/271/EEC)* concerns the collection, treatment and discharge of urban waste water and certain industrial sectors, aiming to protect the water environment from their adverse effects. Due to the high concentration of organic pollutants in farming process wastewaters, even small companies need to treat their effluents. **GASFARM** allows SMFs to comply with legislation affordably and cost-effectively.
- Europe is pledging for a reduction in carbon emissions for all industries. Their “Roadmap for moving to a low carbon economy in 2050” gives insights into what type of technologies need to be developed over the next 10

years and beyond, such as the use of biogas. With **GASFARM greenhouse emissions (especially CH₄) will be considerably reduced** (300,8 tCO₂eq/year for a 3,000 heads pig farm) from outdoor storage of untreated slurry along with the substitution of fossil fuels with the electricity and heat produced in the cogeneration plant (CHP).

- The EC also pledges through their recently adopted *Circular Economy Package*⁴ for **re-using and re-cycling**. Through its AD process **GASFARM** recycles nutrients in the form of organic fertilisers.

SEX AND GENDER ISSUES

Equal opportunities to both genders are in the core of SerecoBiotest (1 out of 4 staff is women performing executive tasks) and we will continue to apply this policy in Phase 1 and in an eventual Phase 2.

1.4 AMBITION

We have identified the technical state-of-art of current solutions offered for small-medium farms: Bioqas Engineering S.R.L. is an Italian company with 7 AD plants installed, with a power ranging from 50 to 75kWe. These plants are characterized by having a single reactor (single-stage process) made from concrete. The cost of a 60kWe plant varies between 500,000€ and 550,000€ (cost varies between 8,300 and 9,200€ per kWe installed). We estimate that **GASFARM will be 20% cheaper** than these plants.

4bioqas is a German company with 3 plants using a technology called NOVA. The reactors can be fed solely with slurry and manure, probably due to the particular fluid dynamics of the reactor. To get at a power of 50kWe 2 reactors are needed. These are brought directly on site with road extraordinary transport. The process is thermophilic in all sections of the reactor resulting in a **risk for the process stability** of the methanogenic phase. The **visual and landscape impact** is remarkable. The plant **requires extraordinary maintenance operations**.

UTS Products GmbH is a German company that sells small AD plants with a technology called Kairos that consists in a single CSTR concrete reactor. The pumping system and the mechanical mixing paddle inside the reactor suggests a **significant energy consumption**. Prices range between 800,000€ and 850,000€ (8,000 to 8,500 €/kW).

Traditional CSTR systems are a scale-down of big-sized CSTR installations. In order to lower costs, the digestion process is operated in a **single reactor** with possible and probable problems arising out and giving **poor performance** conversion and **risks of process** blocks associated with the introduction in the reactor of inhibitory substances (antibiotics, high concentrations of ammonia nitrogen, organic overloads).



Fig 7: Farm AD concrete tank

The concrete-based reactors proposed by all the competitors, are prone to cracking and degradation, leading to biogas leaking and associated risk of explosions or ignition.

TECHNICAL AND ECONOMIC ADVANTAGES OF GASFARM COMPARED TO EXISTING SOLUTIONS

- ✓ **MODULAR SYSTEM - HIGH FLEXIBILITY** for different types and quantities of feedstock. A more resistant acidogenic phase improves reactor stability that can now absorb variations in the biomass used as feedstock, allowing more flexibility when using different sources of waste.
- ✓ **LOW BIOMASS REQUIREMENT:** Separation and optimisation of acidogenic and methanogenic phases enhances bacterial activity and reduces the biomass amount needed for the treatment by at least 50%.
- ✓ **EASY TO CONSTRUCT:** Its mechanical design makes the reactor a cost-effective option for waste treatment in low income areas or spare housing. It is also a stable system, with low maintenance requirements and repair costs. Moreover, it does not need skilled personnel for plant operation.
- ✓ **IMPROVED EFFICIENCY IN ENERGY PRODUCTION:** A scrubber is installed in order to purify the biogas (biogas needs to be cleaned off by impurities before being fed into the grid or the CHP). The biogas yields obtained in test trials (average on 221 litres/kg dry matter) were up to 30% higher than current solutions.

The following table presents GASFARM advantages over the current small scale AD solutions discussed above:

CONSTRUCTION	BIOMASS	OPERATION	COSTS
- No mechanical mixing - Inexpensive to construct - Easy to transport - Reduced clogging & sludge bed expansion - Reduced obstruction & overall dimensions (300m ²) - Low landscape & environmental impact	- ↓↓↓ sludge washing - No requirements for biomass with unusual settling properties - Longer solids retention with respect to CSTR - Retention of biomass without fixed media/solid settling chamber	- Lower HRT and less reaction volumes than CSTR - Can intermittent operation - Extremely stable to hydraulic and organic stocks - Protection from toxic &/or inhibitory material - Modular system expandable for > power	- ↓ capital & operating costs - Absence of mechanical mixing: energy consumption & maintenance savings - Capital investment costs lower than CSTR (26%) - Reduced ROI: 3-5 years - Extremely reduced & easy maintenance

⁴ http://ec.europa.eu/environment/circular-economy/index_en.htm

REASONS TO INVEST

With GASFARM small and medium-size agro-zootechnical farms will benefit from multiple advantages:

- ✓ **Affordable treatment of residues:** GASFARM initial price will be 0.45M€ (that could be reduced up to 300k€ by 2022) with operational costs estimated as 15k€. **ROI: 30%.**
- ✓ **On-site energy generation:** farmers can use the energy recovered for self-supply, eliminating or reducing the cost from grid consumption or sell it to the grid. With an electricity market price of 0.103€/kWh, sale annual turnover is estimated as 57,702€ (46,201€ from electricity and 11,501€ from heat recovery (63kWh capacity).
- ✓ **Reduction in use of chemical fertilisers** (50-70% reduction in artificial N fertiliser purchases) thanks to the improved bio-availability of nitrogen in the outlet digestate.
- ✓ **Flexibility AD waste sources:** Easily customizable mass production for a diversity of substrates.
- ✓ **Easy to install & transport:** installation does not require considerable in-situ civil construction and assembly works, and it is easy transportable.
- ✓ **Green energy incentives maximised:** many European countries prime small biogas productions with higher economic incentives. Abatement of nitrogen in the digestate and high efficiency cogeneration are also awarded.

KEY MARKET APPLICATIONS

We address GASFARM to small-scale farms, i.e., power generation and/or biomethane production generally lower, respectively, to 100kWe and 250Nm³/h. This figure is supported by the following arguments:

- **Small size of European farms:** the structure of the agro-zootechnical industry is fragmented into a high number of small exploitations farms. There were 10.8 million farms (including field crops and livestock) across the EU-28 in 2015. The average size of each agricultural holding (farm) in the EU-28 is 16.1 hectares. Half of the farms are very small farms (less than 2 hectares in size).
- **Maximisation of European biogas incentives:** In EU countries such as Italy and Germany maximum level of green energy generation subsidies are guaranteed below the 100KWe and 250Nm³/h thresholds maximum level of incentives is guaranteed.

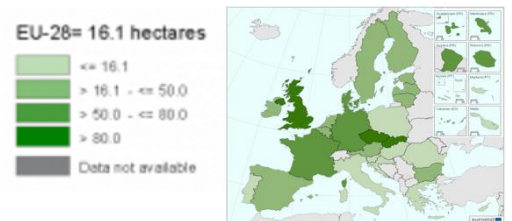


Fig 8: Average EU UAA per holding, 2015

2. IMPACT

2.1 EXPECTED IMPACTS

a) Users/Markets

USER'S NEEDS

The European Agriculture Industry is one of the largest and most important sectors in Europe. It generates around 400 billion euros, employs 10 million people and involve 12K companies, half of which are small farms. Due to the high concentration of organic pollutants involved in food processing wastewaters, even small farms need to treat their effluents under their own responsibilities and cost. AD treatments generate energy and have low operation costs but are normally only affordable for larger companies. In order to comply with Directive 91/271/EEC on Urban Wastewater, SMFs generally pay a waste management fee (80k/year), too high for a small farm. To help secure their sustainability, we have developed a cost-efficient solution based on ABR technology so SMFs can comply with their obligation affordably. Moreover, farms will benefit from on-site energy generation and digester fertiliser, i.e., additional incomes and lower costs, whilst contributing to a low carbon economy.

UNIQUE SELLING POINT

We have identified several drivers for our technology, related mainly to the growing restriction in waste management in the food and agricultural/livestock sector and the demand from SMFs for a cost-efficient and affordable solution. Under this context, we have identified 4 main selling points for GASFARM sales strategy:

- **Installation does not require significant in-situ civil construction** as components are assembled at industrial facilities, easily transportable to the farm given its small size.
- **Easily adaptable to increases in production capacities or to new raw materials** (e.g. from surrounding farms) without requiring major refurbishments. GASFARM can process all types of animal wastes and agricultural wastes, and can be treated separately or mixed.
- **Biogas yields up to 30% higher than current solutions**, which translates into higher incomes (or consumption costs reduced) from a higher energy recovered.
- **Cost-competitive alternative:** On Table 1 we have calculated a cost-benefits analysis for an annual generation of 9,500 tons of waste, using a 63kWh unit, compared to a representative biogas plant:

Parameter	Example European plant	GASFARM
Produced slurry (t/y)	9,650	9,500
Products sold	100% electricity, 50% heat	100% electricity, 50% heat
Prices of products (EUR/kWh)	Electricity: 0.103; Heat: 0.040	Electricity: 0.103; Heat: 0.040
Methane produced (Nm ³ /y)	118,985	238,000
Total investment costs (EUR)	624,000	450,000 ⁽¹⁾
Annual operational costs	43,405	15,100
Annual income	55,040	64,380
Revenue increase		17%

(1) The industrialization of manufacturing will reduce total investment costs up to 300,000 € by 2022

Table 1: GASFARM cost-benefit analysis

The income from the valorisation of the biogas will depend on the size of the farm and feedstock type, ranging, from 13,500€ to 365,000€. In addition, the **digestate is estimated to have a value as fertilizer of around 7,000€** for annual production of 9,500t/y of waste.

MARKET ANALYSIS

MARKET SIZE & STRUCTURE, EUROPEAN DIMENSION & GASFARM PRIMARY MARKET

According to Eurostat statistics, half of the farms across the EU-28 (10.8M) are small farms (<2ha), half of which were small farms (<2ha). In 2013, 29.6% of EU-28 farms were holdings specialised in field crops, 17.4% were specialist permanent crop holdings and 44.7% were specialist livestock holdings. 33.5% of all holdings were in Romania, 13.2% in Poland, 9.3% in Italy and 8.5% in Spain. These holdings are characterised as being small.

Whilst GASFARM reactors can be fed with a variety of agricultural and livestock industry wastes, our primary focus will be the latter, particularly pig farms. This selection is based on the characteristics of this type of farm:

- ✓ Stringent environmental requirements for the management of the farms waste
- ✓ Higher incentives for the production of biogas from small farms animal waste (e.g. in Italy 0,236€/kWh are paid to < 100kWe generation compared to 0,18€/kWh of dedicated crops farms)
- ✓ Lower installation costs: animal farms generally already have the infrastructure for the storage of the digestate and relevant machinery (e.g. centrifuge, separation machines) for its handling.

The EU accounts for more than 22% of the world pork production. Pig population in Europe is estimated in 42.1 million piglets (<20kg), 36.1 million growers (>20kg and <50kg), **58.1 million fattening pigs (>50kg)** and 15.2 million breeders (>50kg). According to Eurostat, **the number of small farms for fattening pigs (10-1.000 pigs) is 3,205,080**, representing more than 99% of these farms in the EU. Within this context we have established the following criteria to implement the commercialization plan:

- 1) High number of **pig farms**: Spain, Germany, Poland, Denmark or France.
- 2) **Small-medium** number: Romania, Poland, Bulgaria, Hungary, Lithuania or Italy.
- 3) **Waste-to-Energy established markets**: UK, Germany, France, Italy, Spain and Scandinavia.

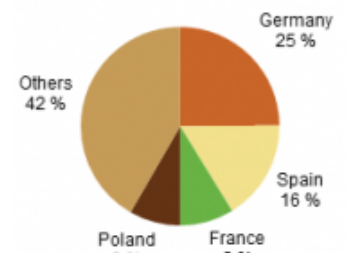


Fig 9: EU-28 PIGS Production 2014

MAIN COMPETITORS

We have identified the following companies as our main competitors: *Biogas Engineering S.R.L.*, *4biogas* and *UTS*, as they offer AD solutions for SMFs (section 1.4 presents information on their comparative products) in the small size biogas plants (<100kWe) market (our market segment). However, GASFARM represents a more cost-efficient solution for SMFs waste management. Other possible competitors are companies that produce equipment of 1MW or higher, with energy efficiency, competitive price and reliability as its key selling arguments. The top 3 companies accounting for 72% of the total market revenue are: Martin GmbH/CNIM (32.8%), Hitachi Zosen Innova AG (31.8%) and Fisia Babcock Environment GmbH (7.3%).

MARKET DRIVERS

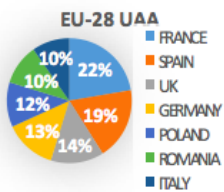
- ✓ Growing European waste-to-energy (WTE) market: this market is estimated to be around 3,300M€ with an annual growth rate of 127% due to the change of Europe environmental policy that encourage the waste management route “from incineration to energy recovery”.
- ✓ Re-activation of current renewable energy production schemes & policies in Europe, e.g., new framework for biomethane injection in the natural gas network or new normative on the use of digestate in fertilisation practices.
- ✓ Use of organic & waste-based fertilisers: The EU has proposed a Regulation to update its current Fertilisers Regulation No 2003/2003 that will ease the access of organic and waste-based fertilisers to the EU single market, increasing their competitiveness against traditional, non-organic fertilisers, typically produced chemically.

MARKET BARRIERS

- ✓ Unfamiliarity with AD of small farmers: concerns about high capital costs for design and construction of competing technologies, limited incentives for investors, difficulties connecting to the electrical grid, price uncertainty for the biogas produced and the timeframe to realize a return on investment.
- ✓ Uncertainty energy sector upon legislative changes could slow down GASFARM market penetration (e.g., the Spanish electricity sector cut off in 2009 financing rates and premiums for small and renewable energy facilities).

b) Company

GASFARM is perfectly aligned with SerecoBiotest business model: we have designed a low-cost, efficient technology solution that can be assembled at the factory and directly delivered to the production site. Therefore, we turn the AD plant industry process from civil engineering into an industrial production. Such innovative approach will open up to a new serial industrial production approach for AD biogas reactors, with a significant cost reduction.

<p>Strategic Partners</p> <p>Technical:</p> <ul style="list-style-type: none"> ✓ <u>Materials suppliers</u>: machinery production, ✓ <u>Industry</u>: Green Technology, CNG and biogas and information technologies ✓ <u>Manufacturer CHP plants</u> ✓ <u>Transporters</u> <p>Commercial:</p> <ul style="list-style-type: none"> ✓ <u>Farms/AD supply chains</u> ✓ <u>ENAMA</u> (institution for agricultural mechanization) ✓ <u>CRA - ING</u> (research unit of agricultural engineering) ✓ <u>Farmer's associations</u> ✓ <u>Financing entities</u> 	<p>Key Activities</p> <ul style="list-style-type: none"> ✓ Metalworking agricultural machinery manufacturer ✓ Environmental technology, industrial ecology ✓ R&D: technology patents ✓ Consulting & Quality control <p>Key Resources</p> <ul style="list-style-type: none"> ✓ GASFARM <u>prototype</u> ✓ <u>International and multidisciplinary teams</u> ✓ Several <u>industry patents</u> (including GASFARM) ✓ <u>AB equipment for testing biogas productivity</u> 	<p>Value Proposition</p> <ul style="list-style-type: none"> ✓ Affordable solution for SMFs: ROI 30% ✓ Biogas yield \uparrow 30% ✓ Low capital & operating costs ✓ Easy transport & installation ✓ Extremely stable to hydraulic and organic shocks ✓ Protection from toxic and/or inhibitory material in influent ✓ Modular expandable system for > powers ✓ Absence of mechanical mixing High SRT <p>With GASFARM: Revenues increase 17%</p>	<p>Customer Relationship</p> <ul style="list-style-type: none"> ✓ Personalized long-term relationship with our customers based on trust and compromise ✓ We have key relationship with Italian, Spanish and Czech companies <p>Channels</p> <ul style="list-style-type: none"> ✓ <u>In-house sales force</u> ✓ <u>Networks</u>: ENAMA ✓ <u>Fairs / Events</u>: Biogas Offenburg and BIOGAS, International gas Hydrates Conference ✓ <u>GASFARM website</u>, companies' website, social media 	<p>Customer Segments</p> <p>Two market segments:</p> <ol style="list-style-type: none"> 1. <u>Crops farms</u> (45%): specialist field & permanent crops 2. <u>Livestock farms</u> (46.7%): specialist grazing, granivore, mixed livestock & mixed crop-livestock <p>Primary market: European small-medium pig farms</p> 
<p>Cost Structure</p> <ul style="list-style-type: none"> ✓ <u>Variable costs</u>: Sereco Biotest solutions and services are tailored to specific needs of the clients ✓ Sereco costs value driven through high quality products & services ✓ GASFARM investment: 150K initial investment + 50K PH1 + 2.5M€ PH2 + 300K for tuning up. 		<p>Revenues Stream</p> <ul style="list-style-type: none"> ✓ Current market distribution: Italy, Spain and Czech Republic. With GASFARM we will access other European countries markets e.g. Poland, and expansion in Germany, Portugal and France ✓ Net profit SERECO with GASFARM project by 2023: 2.1M€ (turnover 2013 150K, 2015 175K) 		

FORECASTED SALES & RETURN ON INVESTMENT: Whilst sales potential for GASFARM is huge (3.2M only pig farms in Europe) we envisage a slow uptake of our technology, due to the barriers noted above. However, we envisage a steady increase of sales as technology begins to be known and sale price decreases upon lower production costs (which will also increase profit margin). With a total investment of 2.7M€ (150K€ initial investment + 50K€ PH1 + 2.5M€ PH2), we estimate a **ROI=2** for the first 5 years of commercialisation of GASFARM.

Year	2019	2020	2021	2022	2023	Cumulative
Units sold	4	8	12	20	30	74
Price unit (M€)	0.45	0.425	0.4	0.375	0.35	2
Turnover (M€)	1.8	3.4	4.8	7.5	10.5	28
Gross Margin (%)	15	15	18	20	20	-
Profit (M€)	0.27	0.51	0.86	1.5	2.1	5.24

Table 2: GASFARM units sold, revenues, costs and profits

2.2 MEASURES TO MAXIMISE IMPACT

a) Dissemination and Exploitation of results

COMMERCIALISATION: During Phase 2 we will industrialize the manufacturing process for GASFARM and we will certify the reactor according to European Regulations and Standards. The commercial strategy will be primarily directed to well-known markets with solid customer segments, i.e., Italy and Spain, focusing on making our supply chain robust before expansion into other markets. On a secondary phase we will reach other European countries markets, i.e., Germany, Poland, Denmark, France, The Netherlands, Belgium and UK. The capacity production will grow which will reduce investment over 30%. This will open the commercialisation of GASFARM to smaller farms with lower gross revenues (e.g., Romania, Poland, Bulgaria, Hungary and Lithuania).

DISSEMINATION: Our dissemination strategy will be based on various channels: GASFARM webpage, edition of promotional documentation (for example, brochures, DVDs, YouTube video clips), mailing, dissemination packs and press releases. Moreover, in order to guarantee maximum dissemination, we will attend relevant national and international events, conferences and workshops.

STAKEHOLDERS from target markets, energy management and farming sector will be involved: European Network for Testing Agricultural Machines (ENTAM), European Biogas Association (EBA), European Federation of Intelligent Energy Efficiency Services (EFIEES), Ente Nazionale per la Meccanizzazione Agricola (ENAMA - Italy), Asociación Española de Biogas (AEBIG - Spain), Asociación de Empresas de Servicios Energéticos (ANESE - Spain).

b) Intellectual property, Knowledge protection & Regulatory Issues

In 2013 we registered *Apparatus for the production of biogas and related method* under the World Intellectual Property Organization (refer to section 4) in order to expand its coverage outside Italy (already patented). We have also requested its recognition under the European Patent Office, currently under evaluation. We will seek its recognition in Spain, Germany, UK, France, Denmark, The Netherlands, Belgium and Portugal primarily.

We performed a technology watch and patent search to ensure our Freedom to Operate (FTO) at the time of submitting our IP application on main databases (EPO, FPO, WIPO, USPTO). Based on this preliminary search and our industrial experience, we found no IP conflicts. Nonetheless, we will do a deeper search during Phase 1.

REGULATORY & STANDARD REQUIREMENTS: GASFARM will be certified by an independent Certification European Company for its compliance with the following European standards and regulations:

- Standard rule UNI 10458:2011: procedures for certification, essential work requirements, construction rules, supply, order and testing of systems for the production and use of biological gas (biogas) by AD.
- ISO 14,001 and 14,025 Environmental Standards certification, including a Life Cycle Analysis (LCA) study.
- Standardised requirements: CEI EN 60079-10; CEI EN 60079-14; Directive 94/9/CE (ATEX); UNI EN 281_1:2012; UNI EN 287-1:2012; UNI EN 288-2:1993; UNI EN 1418:1999; UNI EN 10025:1995; EN 10204 3.1.

3. IMPLEMENTATION

3.1 Work plan – Work package and deliverable

3.2 Management structure and procedures

In order to establish a smooth management of the project procedures (including technical and commercial activities) we have defined and allocated key roles within the project among our key staff:

Project Manager (Dr. Luca Poletti): contact person within the project, as well as for the communications and reporting with the EASME Project Officer. He will supervise the overall running of the project, ensuring the accomplishment of the objectives, the implementation of the IPR Strategy and monitoring the on-going activities in order to prevent and reduce technical and commercial risks.

Technical Manager (Dr. Roberto Poletti): responsible for technical decisions, exchange of technical information with project participants, preparation of technical deliverables and technical risk management. Dr. Andrea Brugoni will support Dr. Poletti in these activities.

Commercialisation Manager (Dr. Luca Poletti): main contact person for the preparation of commercial strategies, dissemination activities, managing relations with potential customers and update of the business plan.

Financial Manager (Dr. Chiara Biscarini): she is responsible for the future exploitation of GASFARM, being in close communication with the Commercial Area and keeping the Business Plan updated according to the current market situation.

DECISION MAKING PROCESS: decisions will be made according to each role’s responsibilities and according to SerecoBiotest’s project management decision making procedures, while seeking consensus, where possible, with the project team and relevant stakeholders.

3.3 Consortium as a whole

GASFARM project will be developed by SerecoBiotest, an Italian R&D services provider in the field of environmental technology and industrial ecology, highly specialised on monitoring and controlling AD plants. We will participate in the project as single participant. However, in order to complement our technical expertise and know-how in specific fields, we will rely on the technical input and industrial expertise in the form of strategic alliances. For instance, we have a cooperation agreement with the University of Perugia (Department of Chemistry) for the development of research activities. Moreover, as we have developed our activities since 1976, we have gained an advantageous and strategic position in the biogas industry that will benefit the project enormously.

4. MEMBERS OF THE CONSORTIUM

4.1 COMPANY DESCRIPTION



Website: www.serecobiotest.it

Short Name: SerecoBiotest

Location: Italy

SerecoBiotest was set up in 1976 as a result of a merging between Biotest, created in 1969, as a chemical and biochemical analytical laboratory and Sereco, an environmental engineering consultancy. SerecoBiotest has rapidly grown to become a leader in the field of advanced environmental services in Umbria, Italy.

We stand out as a dynamical structure active in providing fore-front research and development in the field of environmental technology and industrial ecology based on a synergic integration of different skills. Our team is formed of highly-specialised professionals of diverse backgrounds.

Prestigious national and international project experiences, in cooperation with private and public research centres and Universities, enriched our expertise so as to assume the role of a “high tech shuttle structure”, capable of giving put the results of base-research into an industrial context.

SerecoBiotest has a long experience, gained in Italy and abroad in the following areas: analytical monitoring of water, air and soil, design of treatment systems, renewable energy, environmental management, environmental management, hygiene and prevention, environmental forensics, services for agriculture, training, monitoring natural, research and development. We have recently established a cooperation agreement with the University of Perugia (Department of Chemistry) for the development of research activities in different scientific branches.

We operate according to ISO 9001:2000 certification scheme and complies with the UNI 17025 for the lab activity.

RELEVANT PRODUCTS AND SERVICES

SerecoBiotest provides services in the following areas:

- ✓ Analytics
- ✓ Treatment technology
- ✓ Renewable energies
- ✓ Environmental management
- ✓ Environmental modelling
- ✓ Hygiene and prevention
- ✓ Environmental forensics
- ✓ Agricultural services
- ✓ Education
- ✓ Naturalistic consultancy and monitoring
- ✓ Research & development

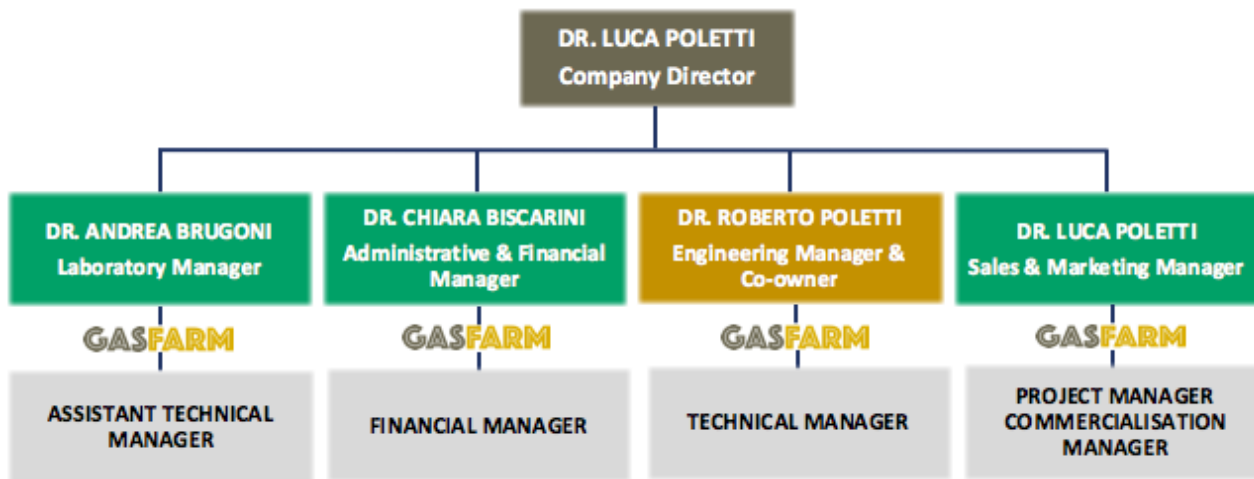
EQUIPMENT AND FACILITIES AVAILABLE AT SERECO

The equipment and facilities available which will be used during the development of GASFARM is:

- Small-scale AD-ABR prototype
- AB equipment for testing biogas productivity
- Chromatographs
- Spectrometers
- Gas sampling equipment
- Software for mechanical design.

MANAGEMENT STRUCTURE OF SERECBIOTEST

The company is directed by Dr. Luca Poletti who owns the majority of the company’s shares. He is the company director and legal representative and supervises the administrative, technical, financial, sales and marketing department.



QUALIFIED AND KEY PERSONNEL

PROJECT & COMMERCIALISATION MANAGER

Dr. Luca Poletti – Managing Director and Technician

STUDIES: Master Degree in Biological Sciences (University of Perugia – 1995)

Responsible for previous EC funded research projects including:

- Leonardo “Transformity”, n. I/99/2/07226/PI/II.1.1.c/FPC (2000-2001)
- NOVOCAT “Tar Decomposition by novel Catalytic Hot Gas Cleaning Methods” NO. NNE5-2000-00098 (2001-2002). Coordinator: VTT-Finland

In-depth experience as a professional consultant and manager of analysis laboratory for over 20 years in the area of environmental protection and industrial pollution. Deep knowledge of the environmental legislative framework at Italian and European level.

Contract professor in quality control of industrial processes at the University of Perugia (2003-2012).

Main areas of expertise:

- Treatment of wastewaters through biological processes (design, lab analysis)
- Characterization, sampling and analysis of atmospheric emissions
- Evaluation of environmental impacts (EIA, LCA)
- Experimental design and chemometry
- Designing and study of energy conversion of biomass with particular reference to biogas
- Author of about 40 scientific publications and congress attendances on applied industrial chemistry, environmental pollution, energy conversion from biomass.

Holder of several patents on industrial microbiology:

- Patent N. RM2005A000073; 18 February 2005 entitled: “Dispositivo per l’abbattimento delle cariche aeromicrobiche in apparecchiature di refrigerazione e condizionamento in ambienti confinati” International Patent Application No. PCT/IT2006 5/000076 “Device and method for preventing aeromicrobial growth in refrigerating equipment and air conditioning apparatus”.
- Italian Patent Application No. MI2009 A001166 “Procedimento ed impianto per l’abbattimento dell’ammoniaca/ammonio presenti in acque reflue mediante precipitazione di MAP”.
- European Patent Application No. 10006730.5 (2009) “Method for cost reduction of ammonia/ammonium removal in wastewater by recovering ammonia energy content and recycling precious compounds”
- Italian Patent Application No.: UD2011Z000027 “Filtro e procedimento per la sua realizzazione” (registered 11/10/2010).
- Italian Patent Application No: N.MI2012A000516 “Apparato per la produzione di biogas e relativo metodo”. (registered 29/03/2012).
- International patent No. PCT/IB2013/000551 “Apparatus for the production of biogas and related method” (registered 29/03/2013).

TECHNICAL MANAGER
Dr. Roberto Poletti – Designer of anaerobic digestion processes
<u>STUDIES:</u> Master Degree in Agriculture Engineering at the University of Perugia (2006)
Expert in environmental agricultural and agro-energy <u>Main area of expertise:</u> <ul style="list-style-type: none"> - Biogas Engineering - Valorisation and recovery of nutrients for fertilization purposes - Industrial procurement for the commissioning of bioenergy industrial plants - Environmental and economic accounting for agriculture companies - On-site commissioning of AD plants - Experimental and testing activities on AD reactor testing and nutrient recovery. <u>Holder of several patents on biogas and nutrient recovery including:</u> <ul style="list-style-type: none"> - Italian Patent Application No. MI2009 A001166 “Procedimento ed impianto per l’abbattimento dell’ammoniaca/ammonio presenti in acque reflue mediante precipitazione di MAP” - European Patent Application No. 10006730.5 (2009) “Method for cost reduction of ammonia/ammonium removal in wastewater by recovering ammonia energy content and recycling precious compounds” - Italian Patent Application No.: UD2011Z000027 “Filtro e procedimento per la sua realizzazione” (registred 11/10/2010). - Italian Patent Application No: N.MI2012A000516 “Apparato per la produzione di biogas e relativo metodo”. (Registered 29/03/2012). - International patent No. PCT/IB2013/000551 “Apparatus for the production ob biogas and related method” (registered 29/03/2013).

ASSISTANT TECHNICAL MANAGER
Dr. Andrea Brugoni –Technician and Laboratory Director
<u>STUDIES:</u> Master Degree in Chemistry (University of Perugia 2001)
<u>Main area of expertise:</u> <ul style="list-style-type: none"> - Analytical chemistry, Sampling and monitoring of AD plants. Over 10 year experience in experimental design and chemometry. - 10 years in charge of an analytical laboratory. He holds widespread and well-established expertise on the use of the following analytical instrumental techniques: GC-MS; GC-FID; HPLC; AAS-GF; FTIR; IC; Calorimetry; Microbiology. <u>Other skills:</u> <ul style="list-style-type: none"> - Atmospheric emission samplings - Characterization of biogas and biofuels - Characterization of wastewaters and AD digestate

FINANCIAL MANAGER
Dr. Chiara Biscarini – Administrative and financing
<u>STUDIES:</u> Master Degree in Pedagogy at the University of Perugia (2010) and high-school degree in Foreign Languages
<u>Main area of expertise:</u> <ul style="list-style-type: none"> - Over 15 years of experience in office and administrative managing of SMEs. - Expert in accounting of research projects. - Expert in accounting of industrial projects.

PREVIOUS INNOVATION PROJECTS

Tar Decomposition by Novel Catalytic Hot Gas Cleaning Methods

NOVACAT. NNE5-2000-00098. Duration: 27 months (01.01.2001 - 31.03.2003)

The objective concentrates on improving gas-cleaning systems.

- Develop and improve nickel-activated filter substrates and screen the performance.
- Determine the stability of the catalytic filter in extended time test with real biomass gasification gas and scale-up the preparation technique.
- Determine the performance of nickel monolith catalyst, catalytic filter and fluid bed dolomite catalyst combined to fluidised bed gratifier.
- Determine long-term stability of a nickel monolith catalyst in real gasification gas, characterise the catalyst and develop and test in pilot-scale an optimised complete gas cleaning train.

Project for transfer of new technological competences to the enterprises for the waste management within the building yard as a sustainable resource.

TRANSFORMITY. I/99/2/07226/PI/II.1.1.c/FPC. Duration: 18 months (1.1.2001 - 31.3.2003)

The objective is to identify the priority needs in terms of skills and qualifications, in particular related to the environment.

- Creation of a permanent inter-network between Universities, Training and Enterprise able to implement an intervention of awareness and information to the companies in the sector about the issues related to the recovery, recycling and waste processing of construction sites.
- Creation of a method that makes it possible and effective intervention of awareness and information provided.
- Development of a system of accreditation of national and transnational value to the target enterprises.

NATIONAL-FUNDED RESEARCH PROJECTS

- **MIPSS** - Microbial Indoor Pollution Solution System aimed at the realization of a device for the abatement of microbial charges in indoor environments, food industry (cold chain and refrigerators).
- **SERMAPP** – aimed at the realization of a system for the removal of nitrogen from eutrophic, high-loaded zootechnical wastewaters, with particular reference to anaerobic digesters (AD) wastewater from swine manure.

RELEVANT PUBLICATIONS

- ❖ A. Poletti, L. Poletti, S. Santini, R. Poletti, - Renewable energy from ammonium-rich anaerobic wastewaters, *Virt&I-Comm.2.2012.3 Ambiente & Sicurezza*. Pag.18-28. November-December 2012 (4).
- ❖ A. Poletti, S. Santini, L. Poletti, R. Poletti, S. Arca - Upgrading biogas quality through the application of gas hydrates. *Virt&I-Comm.4.2013.4*
- ❖ A. Poletti, L. Poletti, R. Poletti S. Santini, F. Ascani - Anaerobic digestion of onion and fennel scraps. *Virt&I-Comm.4.2013.5*

PATENT APPLICATIONS

- **Patent application N.MI2012A000516** 29/03/2012. Patent Cooperation Treaty (PTC) extended. *Apparato per la produzione di biogas e relativo método.*
- **International patent No. PCT/IB2013/000551 WO2013144703 A1.** *Apparatus for the production of biogas and related method.*
- **International Patent Application No. PCT/IT20065/000076.** *Device and method for preventing aeromicrobial growth in refrigerating equipment and air conditioning apparatus.*
- **Patent Application for Industrial Invention. MI2009 A001166.** *Process and plant for the removal of ammonia/ammonium present in wastewater by precipitation of MAP.* Country: Italy, but extended to European level by EPO.
- **Patent Pending.** RCA, SIMONE; POLETTI, ROBERTO; POLETTI, LUCA; BERT, PAOLO (2009). *Method for cost reduction of ammonia/ammonium removal in wastewater by recovering ammonia energy content and recycling precious compounds.* Sereco-Biotest s.n.c. / ACTA S.p.A.

(12) International Application Status Report

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(51) International Patent Classification:

C02F 3/28 (2006.01); C12M 1/107 (2006.01)

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POLETTI, Luca; C/o Sereco Biotest S.N.C. Via Cesare Balbo, 7 I-06121 Perugia (PG) (IT)

(74) Agent(s):

ERCOLANI, Simone, Pietro; Marietti, Gislon e Trupiano S.r.l. Via Larga, 16 I-20122 Milan (IT)

(54) Title (EN): APPARATUS FOR THE PRODUCTION OF BIOGAS AND RELATED METHOD

(54) Title (FR): APPAREIL POUR LA PRODUCTION DE BIOGAZ ET PROCÉDÉ S'Y RAPPORTANT

(57) Abstract:

(EN): Apparatus (1) for producing biogas by the anaerobic digestion of organic material (M), comprising at least one anaerobic reactor (2) provided with a loading section (3) for said organic material and a plurality of reaction chambers (4a, 4b, 5a, 5b, 6a, 6b, 7a, 7b), arranged in line and connected one to each other by deflectors (79) provided with lower (80) and upper (81) alternate passages, for the forced outflow of said organic material through each of said chambers of said plurality of reaction chambers, and means to convey the biogas produced within said one or more reaction chambers outside of said at least one reactor, characterized in that said at least one reactor comprises, as well, means (9) for the controlled recirculation of said organic material between one or more chambers of said plurality of reaction chambers.

(FR): L'invention porte sur un appareil (1) pour la production de biogaz par la digestion anaérobie de matière organique (M), comprenant au moins un réacteur anaérobie (2) doté d'une section de chargement (3) pour ladite matière organique et d'une pluralité de chambres de réaction (4a, 4b, 5a, 5b, 6a, 6b, 7a, 7b), disposées en ligne et raccordées les unes aux autres par des déflecteurs (79) dotés de passages inférieurs (80) et supérieurs (81) alternés, pour la sortie forcée de ladite matière organique en passant par chacune desdites chambres de ladite pluralité de chambres de réaction, et d'un moyen pour transporter le biogaz produit à l'intérieur de ladite ou desdites chambres de réaction vers l'extérieur dudit ou desdits réacteurs, caractérisé en ce que ledit ou lesdits réacteurs comprennent, aussi, un moyen (9) pour la recirculation commandée de ladite matière organique entre une ou plusieurs chambres de ladite pluralité de chambres de réaction.

International search report:

Received at International Bureau: 17 June 2013 (17.06.2013) [EP]

International Report on Patentability (IPRP) Chapter II of the PCT:

Not available

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 AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
 European Patent Office (EPO) : AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR
 African Intellectual Property Organization (OAPI) : BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
 African Regional Intellectual Property Organization (ARIPO) : BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW
 Eurasian Patent Organization (EAPO) : AM, AZ, BY, KG, KZ, RU, TJ, TM

FINANCIAL VIABILITY SELF-CHECK

As sole participant, we have performed a financial viability of our company using the Financial Viability self-check tool provided by the European Commission (<https://ec.europa.eu/research/participants/lfv/lfvSimulation.do>).

Profit and loss account

Assets

1. Subscribed capital unpaid	<input type="text" value="0"/>
2. Fixed assets	<input type="text" value="240 728"/>
2.1 Intangible fixed assets	<input type="text" value="4 338"/>
2.2 Tangible fixed assets	<input type="text" value="236 390"/>
2.3 Financial assets	<input type="text" value="0"/>
3. Current assets	<input type="text" value="140 098"/>
3.1 Stocks	<input type="text" value="1 963"/>
3.2.1 Debtors due within the year	<input type="text" value="47 484"/>
3.2.2 Debtors due after the year	<input type="text" value="0"/>
3.3 Cash at bank and in hand	<input type="text" value="89 957"/>
3.4 Other current assets	<input type="text" value="694"/>
TOTAL ASSETS	<input type="text" value="380 826"/>

Liabilities

4. Capital & reserves	<input type="text" value="277 484"/>
4.1 Subscribed capital	<input type="text" value="465"/>
4.2 Reserves	<input type="text" value="245 381"/>
4.3 Profit and loss brought forward	<input type="text" value="0"/>
4.4 Profit and loss brought for the financial	<input type="text" value="31 638"/>
5. Creditors	<input type="text" value="103 342"/>
5.1.1 Long term non-bank debt	<input type="text" value="0"/>
5.1.2 Long term bank debt	<input type="text" value="0"/>
5.2.1 Short term non-bank debt	<input type="text" value="80 802"/>
5.2.2 Short term bank debt	<input type="text" value="22 540"/>
TOTAL LIABILITIES	<input type="text" value="380 826"/>

Liabilities

Turnover	<input type="text" value="174 560"/>
+ Variation in stocks +/-	<input type="text" value="0"/>
+ Other operating income	<input type="text" value="0"/>
= Operating income	<input type="text" value="174 560"/>
- Costs of material & consumables	<input type="text" value="10 889"/>
- Other operating charges	<input type="text" value="48 340"/>
- Remuneration and charges (Staff costs)	<input type="text" value="40 293"/>
= Gross operating Profit or Loss	<input type="text" value="75 038"/>
- Depreciation and value adjustments on non-financial assets	<input type="text" value="0"/>
= Net operating profit	<input type="text" value="75 038"/>
+ Financial income and value adjustments on financial assets	<input type="text" value="540"/>
- Interest paid	<input type="text" value="400"/>
- Similar charges	<input type="text" value="0"/>
= Profit/loss on ordinary activities	<input type="text" value="75 178"/>
+ Extraordinary income	<input type="text" value="0"/>
- Extraordinary charges	<input type="text" value="0"/>
- Taxes on profits	<input type="text" value="3 540"/>
= Profit/loss for financial year	<input type="text" value="71 638"/>

Financial Viability Simulation



Calculate Ratios

Indicators	Ratio's Results			Analysis	
	Value	Qualification	Quote	Concise	More-in-depth
Quick Ratio	<input type="text" value="1.33667821408"/>	<input type="text" value="Good"/>	<input type="text" value="2"/>	<input type="text" value="Good"/>	<input type="text" value="Good"/>
G.O. Profit Ratio	<input type="text" value="0.00533063247"/>	<input type="text" value="Good"/>	<input type="text" value="2"/>	<input type="text" value="6"/>	<input type="text" value="10"/>
Profitability (1)	<input type="text" value="0.42986938588"/>	<input type="text" value="Good"/>	<input type="text" value="2"/>		
Profitability (2)	<input type="text" value="0.42986938588"/>	<input type="text" value="Good"/>	<input type="text" value="2"/>		
Solvency	<input type="text" value="0.37535913408"/>	<input type="text" value="Good"/>	<input type="text" value="2"/>		

Noteworthy value's Results

Equity Flags	<input type="text" value="Good"/>	<input type="text" value="0.37535913408"/>
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LETTERS OF INTEREST

Out of the engagement we have conducted so far, we have gained interest in GASFARM from several parties, including end-users and research institutions:



SERECO BIOTEST SNC
Via C.Balbo, 7
06121 PERUGIA UMBRIA
ITALY

Wednesday, April 19th 2016

Subject: Expression of Interest by Sánchez Romero Carvajal Jabugo S.A. for the novel technology capable of extending the adoption of biogas production for energy valorization to small agricultural and agro-zootechnical companies developed by Sereco Biotest SNC.

Dear Mr. Luca Poletti,

Sánchez Romero Carvajal Jabugo S.A. is pleased to support the project proposal that would be executed under the programme Horizon 2020 based on a novel technology capable of extending the adoption of anaerobic digestion to small agricultural and/or agro-zootechnical companies. Having expressed our interest and support in previous statements, hereby we confirm in this letter our interest in giving our support during the execution of the proposed proposal and in the subsequent innovation project.

As a SME of we consider the technology used is very promising for our industry and we would like to closely follow the eventual advancement and the results of the innovative project.

In the future, we will take in consideration the possibility of establishing a collaboration with your company during the feasibility study and innovation project and after its termination.

Yours Sincerely



Cinco Jotas
MR JUAN CARLOS DÁVILA FERREIRA
JABUGO S.A. SINCE 1879
Quality Manager

SERECO BIOTEST SNC
Via C.Balbo, 7
06121 PERUGIA UMBRIA
ITALY

Wednesday, April 19th 2016

Subject: Expression of Interest by Gestión Agropecuaria de Montanera, S.L. tax number B11500188 for the novel technology capable of extending the adoption of biogas production for energy valorization to small agricultural and agro-zootechnical companies developed by Sereco Biotest SNC.

Dear Mr. Luca Poletti,

Gestión Agropecuaria de Montanera, S.L is pleased to support the project proposal that would be executed under the programme Horizon 2020 based on a novel technology capable of extending the adoption of anaerobic digestion to small agricultural and/or agro-zootechnical companies. Having expressed our interest and support in previous statements, hereby we confirm in this letter our interest in giving our support during the execution of the proposed proposal and in the subsequent innovation project.

As a SME of we consider the technology used is very promising for our industry and we would like to closely follow the eventual advancement and the results of the innovative project.

In the future, we will take in consideration the possibility of establishing a collaboration with your company during the feasibility study and innovation project and after its termination.

Yours Sincerely

Mr José María Pariente Cornejo

Position in **Gestión Agropecuaria de Montanera, S.L**


GESTIÓN AGROPECUARIA DE MONTANERAS, S.L.
P.P.

SERECO BIOTEST SNC
Via C.Balbo, 7
06121 PERUGIA UMBRIA
ITALY

Friday, April 22th 2016

Subject: Expression of Interest by Azienda Agricola Frantoio Peltristo for GASFARM Phase 1 project of Horizon 2020 Programme.

Dear Mr. Luca Poletti,

Azienda Agricola Frantoio Peltristo is pleased to support the project proposal for a Phase 1 that would be executed under the SME Instrument based on a novel technology capable of extending the adoption of anaerobic digestion to small agricultural and/or agro-zootechnical companies. Having expressed our interest and support in previous statements, hereby we confirm in this letter that we would be possibly interested in giving our support during the execution of the proposed Phase 1 and also in the subsequent Phase 2 for the mentioned project, coordinated by Sereco Biotest.

As a SME we consider the technology used is very promising for our industry and we would like to closely follow the eventual advancement and the results of the innovative project.

In the future, we will take in consideration the possibility of establishing a collaboration with your company during the feasibility study and innovation project and after its termination.

Yours Sincerely

Mr. Carlo Peltristo

Legal representative of **Azienda Agricola Frantoio Peltristo**


PELTRISTO CARLO
FRANGITURA OLIVE
Via Casalino Alto, 13
Pietrafitta (PG)
P.IVA 01367180545



UNIVERSITÀ DEGLI STUDI
DI PERUGIA

**UNIVERSITY OF PERUGIA
DEPARTMENT OF CHEMISTRY, BIOLOGY AND BIOTECHNOLOGY
LABORATORY OF INORGANIC CHEMISTRY FOR CATALYSIS
AND THE ENVIRONMENT**

Via Elce di Sotto, 8 06123 PERUGIA ITALY
Tel. + 39075585-5577 - Fax +39075585-5598
e-mail: gianfranco.bellachioma@unipg.it

SERECO BIOTEST SNC
Via C.Balbo, 7
06121 PERUGIA UMBRIA
ITALY

Thursday, April 14th 2016

**Subject: Expression of Interest by the Department of Chemistry of the
University of Perugia for GASFARM Phase 1 project of Horizon
2020 Programme.**

Dear Mr. Luca Poletti,

This letter is to express the profound interest of **the Department of Chemistry of the University of Perugia** in the proposal you are involved in based on a novel technology capable of extending the adoption of anaerobic digestion to small agricultural and/or agro-zootechnical companies.

As a University we consider that the technology used is very promising for the agro-industrial sector and we would like to closely follow the eventual advancement and the results of the innovative project.

In the future, we will take into due consideration a future scientific collaboration in the framework of the dissemination of your product and commercialisation activities.

Yours Sincerely

Prof. Gianfranco Bellachioma
Chair of Instrumental Analytical Chemistry



Digita qui
l'indirizzo

Digita qui il nome

Digita qui i recapiti telefonici e l'email



UNIVERSITÀ
DI CAMERINO

Camerino, April 13, 2016

To SERECO BIOTEST SNC
Via C. Balbo, 7
06121 Perugia (ITALY)

Subject: Expression of Interest for GASFARM Phase 1 project in the field of Horizon 2020 Programme.

Dear Mr. Luca Poletti,

This letter is to express my profound interest in the proposal you are involved based on a novel technology capable of extending the adoption of anaerobic digestion to small agricultural and/or agro-zootechnical companies.

I consider the technology employed very promising for the agro-industrial sector and I would like to closely follow the eventual advancement and the results of the innovative project.

In the future, we will take in serious consideration a scientific collaboration in the framework of the dissemination of your product and commercialisation activities.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'Carlo Renieri', is written above the printed name.

Carlo Renieri

Professor of general zootechny
and genetic improvement
University of Camerino

Scuola di Scienze del Farmaco
e dei Prodotti della Salute
Facoltà di Farmacia

www.unicam.it

62032 Camerino (Italy)
Piazza dei Costanti
Tel. +39 0737 402455/56
Fax +39 0737 402283
scuola.farmaco@unicam.it

Direttore:
Prof. Francesco Amenta

direttore.farmaco@unicam.it

4.2 THIRD PARTIES INVOLVED IN THE PROJECT

As stated in Section 3 of our Phase 1 proposal, we will be subcontracting some of the activities necessary to complete the feasibility study, in order to be complemented with the necessary expertise, ensuring its successful development. In the table below we provide details of the activities that will involve sub-contractors.

Does the participant plan to subcontract certain tasks	Y
<p>The main tasks planned to be sub-contracted are:</p> <ul style="list-style-type: none"> ❖ Risk Assessment: Completion of a Critical Risk Factors analysis, detailing risk type, occurrence and impact. This activity should produce a description of the risks GASFARM project faces currently and in the future. It must cover all aspects of the project including: technical, financial, market, stakeholders, alliances, climate, relevant infrastructure (e.g. transport), product availability, etc. Each identified risk must be allocated with an occurrence and impact scoring, and be accompanied by mitigation and contingency measures. Sub-contractor: to be determined Work Plan related Tasks: Task 4 Allocated budget: 2,000 € ❖ Market study & Marketing strategy design: Definition and geographic distribution of market segments, identification of potential customers, definition of products/services upon customers identified, identification of potential suppliers and identification of competitors. Lay out of the marketing and sales strategy, assessment of strategic, market access and distribution strategy. Description of the pricing strategy and justification. Inclusion of expected gross profit margins. Outcomes will feed into the Business Plan. Sub-contractor: to be determined Work Plan related Tasks: Task 2.2, Task 3, Task 4 Allocated budget: 5,300 € ❖ Partners Search: Search for potential national and international partners to participate in the manufacturing, distribution and commercialisation of the final product. The profile of possible partners will be: <ol style="list-style-type: none"> 1) <i>End-users:</i> small-medium size agricultural and animal farms in Europe, particularly in countries of our primary market. Their main contribution to the project will be the completion of testing activities at their facilities and co-evaluation of results in order to optimise the final product. 2) <i>Materials suppliers:</i> manufacturing companies in Europe to provide the materials required to build the scaled prototype of GASFARM and for its future industrialisation. 3) <i>CHP plant manufacturer:</i> European companies offering small scale CHP plants suitable to be combined with GASFARM solution. Outcome will feed into the Business Plan. Sub-contractor: to be determined Work Plan related Tasks: Task 2.1, Task 4 Allocated budget: 2,500 € 	

SUB-CONTRACTOR COMPANY PROFILE & SELECTION PROCEDURE

- The company profile we have defined as best suited to complete the activities above should include extensive experience involved in research, development and innovation services to companies e.g. product development or process conceptual design to the delivery of market-oriented technologies, analysis of commercial potential, assessment of actual and future markets and overall feasibility experience. For the activity of *partners search* we will look for a company with broad access to relevant markets and extensive and advantageous networking.
- All the sub-contractors above will be assessed and chosen following a thorough selection procedure to ensure best price-quality ratio (based on technical/industrial expertise, planning and budget), no conflict of interest, confidentiality and transparency in the execution of the tasks.

5. ETHICS AND SECURITY

5.1 ETHICS

No ethical issues will be compromised during the execution of GASFARM project.

5.2 SECURITY⁵

- activities or results raising security issues: NO
- 'EU-classified information' as background or results: NO

⁵ Article 37.1 of Model Grant Agreement. Before disclosing results of activities raising security issues to a third party (including affiliated entities), a beneficiary must inform the coordinator — which must request written approval from the Commission/Agency; Article 37. Activities related to 'classified deliverables' must comply with the 'security requirements' until they are declassified; Action tasks related to classified deliverables may not be subcontracted without prior explicit written approval from the Commission/Agency.; The beneficiaries must inform the coordinator — which must immediately inform the Commission/Agency — of any changes in the security context and — if necessary — request for Annex 1 to be amended (see Article 55)

ESTIMATED BUDGET FOR THE ACTION (page 1 of 1)

	Estimated eligible ¹ costs (per budget category)		EU contribution		
	A. Costs of the feasibility study (direct and indirect costs)	Total costs	Reimbursement rate %	Maximum EU contribution ²	Maximum Grant amount ³
Form of costs ⁴	Lump sum				
Beneficiary/ Consortium	50000.00	71429.00	70.00	50000.00	50000.00

1 See Article 6 for the eligibility conditions.

2 This is the theoretical amount of EU contribution that the system calculates automatically (by multiplying all the budgeted costs by the reimbursement rate). This theoretical amount is capped by the 'maximum grant amount' (that the Commission/Agency decided to grant for the action) (see Article 5.1).

3 The 'maximum grant amount' is the maximum grant amount decided by the Commission/Agency. It normally corresponds to the requested grant, but may be lower.

4 See Article 5 for the form of costs.

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MODEL ANNEX 4 FOR H2020 SME Ph1 — MULTI

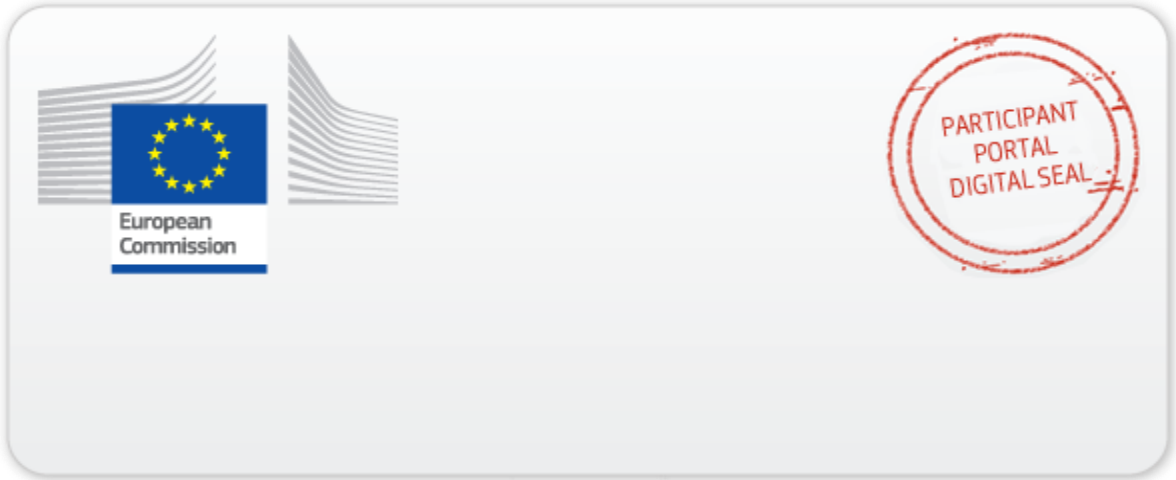
FINANCIAL STATEMENT FOR CONSORTIUM [name] FOR REPORTING PERIOD [reporting period]

Eligible ¹ costs (per budget category)		EU contribution		
A. Costs of the feasibility study (direct and indirect costs)	Total costs	Reimbursement rate %	Maximum EU contribution	Requested EU contribution
Form of costs ²	Lump sum			
Consortium	50 000	71 429	70%	50 000

The consortium hereby confirms that:
 The information provided is complete, reliable and true.
 The costs declared are eligible (see Article 6).
 The costs can be substantiated by adequate records and supporting documentation that will be produced upon request or in the context of checks, reviews, audits and investigations (see Articles 17, 18 and 22).

¹ See Article 6 for the eligibility conditions

² See Article 5 for the forms of costs



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