PYRAGRAF

D1.6 Project Management Plan

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Beneficiary: IPP

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Executive summary

This deliverable presents the core management plan for the PYRAGRAF project. In general, the project management revolves around administrative, legal and financial issues. This work is substantially supported by the use of PYRAGRAF-related mailing lists as well as by using a MS Sharepoint repository to create and share documents, providing templates and distributing guidelines and overall project information. This deliverable focuses on describing internal work processes, reporting strategies and requirements as well as outlining the management structures within the poject. Briefly, project management encompasses:

- → Management of the consortium.
- → Communication within the consortium as well as with the EC.
- → Quality assurance and risk management.
- → Supervising meetings (presencial or on-line) for all partners.
- → Monitoring of resource expenditure.
- → Submission of reports and deliverables.
- → Management of contractual issues and timely distribution of corresponding documents and relevant information to partners (e.g. regarding Grant Agreement and Consortium Agreement),
- → Communication between consortium partners and the EU on project- and funding-related questions.
- → Management of budget and distribution of payments to partners, etc.

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1. Project overview

PYRAGRAF aims at launching a modular and solar-assisted pyrolysis unit to incorporate renewable energy technologies in agriculture and forestry. The project will demonstrate the conversion of agricultural and forestry residues and wastes into sustainable and added-value products for agriculture and forestry applications (biochar and wood vinegar), as well as renewable energy carriers (bio-oil and pyrogas) for local use.
The PYRAGRAF project embraces economic and environmental sustainability to optimize production flows for the sustainable production of products from the pyrolysis of agricultural and forestry residues and wastes. From the point of view of the circular economy, the use of products such as bio-oil, pyrolysis gas, wood vinegar and biochar should be expanded to increase the potential for carbon-efficient resource circulation. The carbon reduction benefits are prominent when biochar is used for different applications, mainly in carbon sequestration where GHG emissions caused by biomass pretreatment and biochar production can be neutralized. Rapid market development is needed for biochar use as a fertilizer and soil improver and wood vinegar as a biopesticide. To this end, Europe must prepare for the regulation and deployment of these products at scale and establish support schemes for the involvement of farmers and foresters (F&F) as prosumers of renewable energy. PYRAGRAF's ambition is to demonstrate the production of pyrolysis products to be applied as ecosystem services, economically and innovatively, based on an advanced technological concept. This demonstration will facilitate the decentralized use of renewable energy and the cost-effective decentralized production of renewable energy carriers, increasing sustainability and circularity in agriculture with positive effects on biodiversity. The main innovations to achieve this ambition are described next.
The technology proposed by PYRAGRAF is a promising solution to obtain sustainable and cost-effective products for agriculture and forestry applications, enhance crop growth performance and soil quality (biochar and wood vinegar), and supply renewable energy carriers for local use (bio-oil and pyrogas). As a result of these intentions, the methodology of PYRAGRAF will be created and structured to reach the following key outcomes:

- → Validation of the operation of a mobile solar-assisted and integrated slow pyrolysis unit (solar dish concentrator + screw conveyor dryer + pyrolysis reactor + product separation process), with optimal efficiency of feedstock conversion and using cost-effective technology. This demonstrator is expected to reach TRL 7;

- → Validation of applications for the final products obtained from slow pyrolysis, namely for agriculture and forestry activities and for energy production;

- → Validation of the project sustainability in the economic, environmental, and social domains.

Due to the overall complexity and time required to develop the project, PYRAGRAF will be supported by a suitable methodology focused not only on the development and testing of technologies and processes, but also on the analysis of results and achievements from previous related projects, interdisciplinarity of the involved entities, gender balance measures, open science practices, and data management. In the next sections, a description of these methodological approaches to be used during PYRAGRAF will be performed.

2. Workplan

2.1. Work packages and tasks

To successfully develop PYRAGRAF's concept, the project is organized in 7 work packages (WPs), spanning multi-disciplinary fundamental and interconnected applied research (WP2), towards the implementation and validation of an integrated and scaled concept using solar energy coupled with the thermochemical conversion of agricultural and forestry biomass residues and wastes for biochar, wood vinegar and energy vectors' production (WP3, WP4, WP5). This concept is complemented by environmental, social, economic, and sustainability assessments (WP6). Dissemination & communication & exploitation together with multidisciplinary skill development is assured through WP7, as well as the coordination & monitoring of the progress so that the settled strategic and technical objectives are achieved on time and within budget (WP1). All WPs are intimately connected among them to ensure a cooperative project in what concerns the management and transfer of information and results between activities led by several entities of four European countries (Portugal, Germany, Sweden, and Poland) and a Horizon Europe-associated country (Turkey). PYRAGRAF combines different fundamental knowledge disciplines and expertise provided by these entities, ranging from agronomy sciences, bioenergy, chemistry, biological sciences, and other engineering fields (e.g., mechanics and electricity). Therefore, the project will ensure appropriate international cooperation towards the achievement of the general and specific goals established for the project and contribute to the effective implementation and use of the technology that is expected to reach a demonstration level (TRL 7). PYRAGRAF's WPs are described in Figure 1, along with timeframe and corresponding WP leaders.

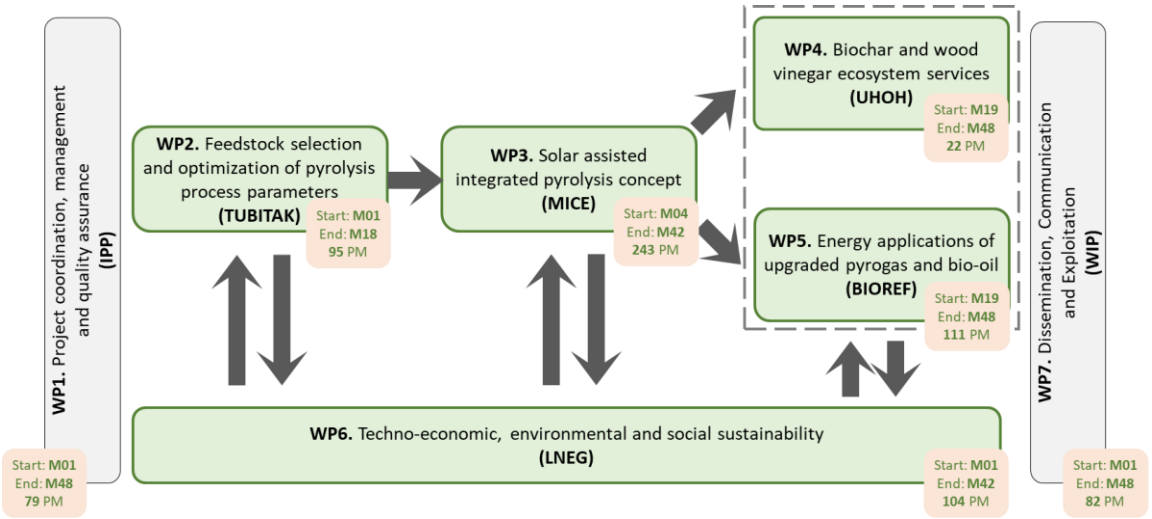

Figure 1. Description of PYRAGRAF WPs, leaderships, and interconnections.

Table 1 is a list of all tasks and associated subtasks that are integrated into the different WPs, as well as their leaders and durations.

Table 1. List of tasks and subtasks, leaders, and corresponding durations.

Number	Name	Duration	Leader
T1.1	Project management	M1-48	IPP
T1.2	Scientific & technical coordination	M1-48	BIOREF
T1.3	Data management, quality assurance, and risk management	M1-48	IPP
T1.4	Equality and equity monitoring	M1-48	BIOREF
T2.1	Selection of local feedstocks and supply chains	M1-M9	TUBITAK
T2.2	Development of smart and innovative screw conveyor biomass dryer	M1-M12	TUBITAK
T2.3	Optimization of biomass pyrolysis parameters	M4-M18	UHOH
T2.4	Characterization of pyrolysis products	M7-M18	UHOH
T2.5	Modification and improvement of biochar characteristics	M7-M18	UHOH
T2.6:	Optimization of process parameters for the gasifier burner	M7-M18	TUBITAK
T3.1	Process simulation and flowsheet development with mass and energy balance	M4-M18	KIT
T3.2	Design and basic engineering for solar-assisted integrated pyrolysis unit	M7-M24	MICE
T3.3	Development and construction of the different solar-assisted integrated pyrolysis modules	M13-M33	MICE
Subtask 3.3.1: Engineering Procurement Construction (EPC):			

Subtask 3.3.2: Solar-assisted gasifier-burner module			
Subtask 3.3.3: Biomass dryer module:			
Subtask 3.3.4: Pyrolysis module:			
Subtask 3.3.5: Preliminary tests on individual modules and the complete unit assembled			
T3.4	On-site assembly, testing, validation, and long-term operation of the solar-assisted integrated pyrolysis	M31-M42	MICE
T3.5	Biochar, wood vinegar, bio-oil and pyrogas production and quality assurance	M37-M42	KIT
T4.1	Demonstration of the potential of biochar	M19-M48	UHOH
T4.2	Demonstration of the potential of tailor-made biochar	M19-M30	UHOH
T4.3	Demonstration of the potential of wood vinegar	M19-M48	AU
T5.1	Pyrogas clean-up and catalytic upgrading of raw pyrolysis vapors [] L:;	M19-M42	KTH
Subtask 5.1.1: Catalytic upgrading of raw pyrolysis vapors			
Subtask 5.1.2: Clean-up system for pyrogas			
T5.2	Bio-oil upgrading and blending	M19-M42	BIOREF
T5.3	Energy assessment of pyrogas and bio-oil applications	M25-M48	IPP
Subtask 5.3.1: Combustion tests using blends with pyrogas and bio-oil mixed with other fuels			
Subtask 5.3.2: Tests of pyrogas use in fuel cells: an alternative application for pyrogas is in fuel cells for electricity production			
T6.1	On-farm energy assessments and benchmarking of peak demands and seasonal energy use (electricity, gas, and	M1-M15	LNEG

	diesel)		
T6.2	Assessment of solar energy integration impact on energy/feedstock demand	M7-M30	LNEG
T6.3	Techno-Economic Assessment	M7-M36	LNEG
T6.4	Environmental Life Cycle Assessment	M7-M42	LNEG
T6.5	Social Acceptance and Socio-Economic Life Cycle Assessment	M19-M42	LPIT
T7.1	Dissemination and Communication Strategy	M1-M48	WIP
Subtask 7.1.1 Communication and dissemination plan			
Subtask 7.1.2 Development of project image and network			
Subtask 7.1.3 Dissemination activities			
Subtask 7.1.4 Communication activities			
Subtask 7.1.5 Policy guidelines and regional action plans			
T7.2	Exploitation and Business Strategy	M1-M48	KTH
T7.3	Liaison and Networking Activities and Final Conference	M1-M48	WIP

2.2. Gantt chart

Figure 2 shows PYRAGRAF's Gantt diagram.

Work Package/Task		Partners	YEAR 1				YEAR 2				YEAR 3				YEAR 4				Duration [m]
		PP BIOREF KIT TUBITAK KTH LEEDARK UHOH AU LNEG LPIT CARBO BSC WFCE AGROK TOPSOE VREI NAZDER MS MJL WP AdMsors	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	
WP1	**Project coordination, management, and quality assurance**																		48
T1.1.	Project management																		48
T1.2.	Scientific & technical coordination			D1.1a		D1.1b		D1.1c		D1.1d		D1.1e		D1.1f		D1.1g		D1.1h	48
T1.3.	Data management, quality assurance and risk management		D1.2a	D1.3a		D1.4a		D1.3b	D1.2b	D1.4b		D1.2c D1.3c		D1.4c		D1.3d		D1.2d D1.4d	48
T1.4.	Equality and equity monitoring															D1.5			48
WP2	**Feedstock selection and optimization of pyrolysis process parameters**																		18
T2.1.	Selection of local feedstocks and supply chains				D2.1														9
T2.2.	Development of smart and innovative screw conveyor biomass dryer					D2.2													12
T2.3.	Optimization of biomass pyrolysis parameters							D2.3											15
T2.4.	Characterization of pyrolysis products							D2.4											12
T2.5.	Modification and improvement of biochar characteristics							D2.5											12
T2.6.	Optimization of process parameters for the gasifier burner							D2.6											12
WP3	**Solar-assisted integrated pyrolysis demonstrator**																		39
T3.1.	Process simulation and flowsheet development with mass and energy balance							D3.1											15
T3.2.	Design and engineering for solar assisted integrated pyrolysis units									D3.2									18
T3.3.	Development and construction of the different solar-assisted integrated pyrolysis modules												D3.3						21
T3.4.	On-site assembly, testing, validation and operation of the solar-assisted integrated pyrolysis															D3.4			12
T3.5.	Biochar, wood vinegar, bio-oil and pyrogas production and quality assurance															D3.5			6
WP4	**Biochar and wood vinegar ecosystem services**																		30
T4.1.	Demonstration of the potential of biochar												D4.1a					D4.1b	30
T4.2.	Demonstration of the potential of tailor-made biochar											D4.3							12
T4.3.	Demonstration of the potential of wood Vinegar												D4.2a					D4.2b D4.4	30
WP5	**Energy applications for upgraded pyrogas and bio-oil**																		30
T5.1.	Pyrogas clean-up and catalytic upgrading of raw pyrolysis vapors															D5.1			24
T5.2.	Bio-oil upgrading and blending															D5.2			24
T5.3.	Energy assessment of pyrogas and bio-oil applications													D5.3				D5.4	24
WP6	**Techno-economic, environmental and social impact assessment**																		42
T6.1.	On-farm energy assessments and benchmarking of peak demands and seasonal energy use				D6.1a		D6.1b												15
T6.2.	Assessment of solar energy integration impact on energy/feedstock demand											D6.2							24
T6.3.	Techno-Economic Assessment							D6.3a						D6.3b					30
T6.4.	Environmental Life Cycle Assessment										D6.4a					D6.4b			36
T6.5.	Social Acceptance and Socio-Economic Life Cycle Assessment															D6.5			24
WP7	**Dissemination, Communication and Exploitation**																		48
T7.1.	Dissemination and Communication Strategy			D7.1a D7.2		D7.1b D7.5a	D7.3			D7.1c D7.5b				D7.1d		D7.1e D7.4		D7.1f D7.5c	48
T7.2.	Exploitation and Business Strategy					D7.7a		D7.6a		D7.7b				D7.7c				D7.7d D7.6b	48
T7.3.	Liaison and Networking Activities and Final Conference																	D7.8	48

Figure 2. PYRAGRAF's Gantt diagram.

2.3. Deliverables

Table 2 shows all the deliverables to be submitted during the project's lifetime.

Table 2. PYRAGRAF's list of deliverables.

Number	Title	WP	BEN	Due date - Type
D1.1	Scientific & Technological Progress Report	1	IPP	M48 - SEN
D1.2	Data Management Plan	1	IPP	M6 - PU
D1.3	Risk Management and Quality Assessment Plan	1	IPP	M6 - PU
D1.4	Innovation Landscape Scenario & Strategy Plan	1	KTH	M12 - PU
D1.5	Gender Balance Report	1	BIOREF	M40 - PU
D1.6	Project Management Plan	1	IPP	M2 - PU
D2.1	Report on the characterization of local feedstocks	2	TUBITAK	M8 - SEN
D2.2	Report on the development of smart and innovative screw conveyor biomass dryer	2	TUBITAK	M12 - SEN
D2.3	Report on the optimization of biomass pyrolysis parameters at pilot scale and gasifier burner	2	KIT	M18 - SEN
D2.4	Report on the biochar and wood vinegar characterization	2	UHOH	M18 - SEN
D2.5	Report on modification of biochar characteristics	2	UHOH	M18 - SEN
D2.6	Report on optimization tests from the gasifier burner unit	2	TUBITAK	M18 - SEN
D3.1	Base case process model and parameters for the solar-assisted gasifier-burner, biomass dryer, and pyrolysis modules	3	KIT	M18 - SEN
D3.2	Report on BEDP	3	MICE	M24 - SEN
D3.3	Feasibility study and solar-assisted gasifier, dryer, and pyrolysis engineering report	3	MICE	M33 - SEN
D3.4	Report on unit modules assembly and longterm operational tests for the integrated renewable energy production plant	3	MICE	M42 - SEN
D3.5	Product quality and process optimization	3	KIT	M42 - SEN
D4.1	Potential assessment of biochar application	4	UHOH	M48 - SEN

D4.2	Report on the main experimental setups and field tests using the wood vinegar produced	4	AU	M48 - SEN
D4.3	Report about field tests using activated biochar	4	UHOH	M30 - SEN
D4.4	Final performance evaluation of the PYRAGRAF products (biochar and wood vinegar) in different countries	4	AU	M48 - SEN
D5.1	Report about gas quality and performance from pyrolysis vapours and corresponding upgrading treatments	5	BIOREF	M42 - SEN
D5.2	Report about the upgrading of bio-oil	5	BIOREF	M42 - SEN
D5.3	Report on the performance of pyrogas in SOFC	5	BIOREF	M36 - SEN
D5.4	Report on the final performance of pyrogas and bio-oil in dual-fuel engines and SOFC	5	BIOREF	M48 - SEN
D6.1	Report on the assessment of on-farm energy requirements	6	LNEG	M15 – SEN
D6.2	Solar fraction evaluation for selected locations	6	LNEG	M30 – SEN
D6.3	Report on the techno-economic assessment study	6	LNEG	M36 – SEN
D6.4	Report on the environmental life cycle assessment study, social acceptance, and socio-economic life cycle assessment	6	LNEG	M42 – PU
D6.5	Report on the business and production processes	6	LPIT	M42 - PU
D7.1	Communication and dissemination plan	7	WIP	M6 – PU
D7.2	Definition of project branding	7	WIP	M6 – PU
D7.3	Introductory/Conceptual video about the project	7	WIP	M15 – SEN
D7.4	Scientific-Technical/Guidance Video	7	WIP	M42 – PU
D7.5	Policy guidelines and regional action plans	7	IPP	M48 – PU
D7.6	Exploitation plan	7	WIP	M48 – PU
D7.7	Joint market assessment of pyrolysis products	7	WIP	M42 – PU
D7.8	Final conference and scientific technic workshop	7	WIP	M48 – PU

In total, 39 deliverables are scheduled in PYRAGRAF. 8 of these are due by M12, 8 by M24, 6 by M36, and 17 by M48. Templates for deliverables have been created in Word are available via the project's repository (MS Sharepoint).
In order to ensure the quality of deliverables, a clearly structured review process is established in this deliverable. This process is based on minimal rules which are implemented mainly by the workpackage leader (WPL) together with the Project Manager (PM):

- → There should be at least one reviewer per deliverable, but one can choose more if one thinks it suitable.
- → The peer reviewer should be chosen from an organisation other than the one(s) responsible for the deliverable.
- → The approval delegate is the WPL.
- → An excel spreadsheet will be made available in the project's repository, detailing the deliverable author(s), reviewer(s), nature, dissemination level and deliverable production timings (Figure 3). If adjustments are required, the spreadsheet is updated accordingly.

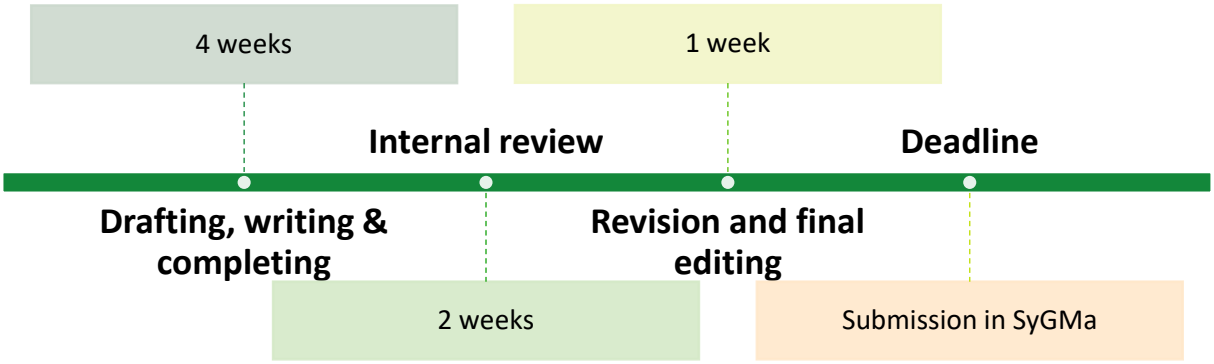

Figure 3. Deliverable production and submission timmings.

- → Deliverables are created and shared via MS Sharepoint which also allows to collaboratively work on and have versioning control of the documents in MS Teams.
- → Review activities are coordinated via the above mentioned spreadsheet and e-mails.
- → Deliverables are not only reviewed by one or two consortium members, but are also given a final revision for style and language by the PM.
- → The WPL of the respective deliverable is responsible for its final approval.
- → The submission of deliverables is monitored through PYRAGRAF's website where those planned as public are made available.
- → The PM submits the deliverable by uploading them to SyGMa. The Project Officer (PO) is additionally informed by sending the deliverable's PDF version via e-mail.

→ The status of overdue deliverables is persistently checked and discussed within the consortium during Steering Committee (SC) meetings.

→ The PM will send regular notications via email, according to the timeframe established in Figure 3.

→ If there is potential to have more than a one-month delay on deliverable submission, the PM will inform the PO accordingly, providing a proper justification from the partners involved the deliverable at issue.

2.4. Milestones

Table 3 presents the list of milestones that need to be achieved within PYRAGRAF's lifetime.

Table 3. PYRAGRAF's list of milestones.

Number	Title	WP	BEN	Due date
1	Definition of feasible feedstock supply chains (two per each country), used to feed and test the PYRAGRAF concept	2	TUBITAK	8
2	Obtention of the optimal parameters for the smart and innovative screw conveyor biomass dryer	2	TUBITAK	12
3	Obtention of the optimal parameters for the selected biomass feedstocks in the pyrolysis reactor	2	KIT	18
4	Obtention of the optimal parameters for the operation of the gasifier burner at the pilot scale	2	TUBITAK	18
5	Obtention of the optimal flowsheet and process parameters for the mobile unit (using the simulation model)	3	KIT	18
6	Approval of the BEDP and project guidelines for the mobile unit	3	MICE	24
7	Definition of the detailed EPC for the individual modules - solar-assisted gasifier, screw conveyor dryer, and pyrolysis reactor	3	MICE	33
8	Construction and validation of the individual modules	3	MICE	33
9	Assembly and validation of operation for the complete unit (long duration tests)	3	MICE	42
10	Quality assurance of the final products	3	KIT	42
11	Selection of suitable target plants/crops for field experiments with biochar and wood vinegar, in each country	4	UHOH	33

12	Successful demonstration of biochar use in the improvement of soil quality during agricultural and forestry activities	4	UHOH	48
13	Validation of the pyrogas cleaning process using activated biochar as a bed adsorbent of gaseous contaminants	4	UHOH	30
14	Successful demonstration of wood vinegar use in reducing pest infestations and plant/ crop biodegradation, during agricultural and forestry activities	4	AU	48
15	Successful production of cleaned pyrogas for energy applications	5	BIOREF	42
16	Successful production of bio-oil for energy applications, in accordance with the ASTM D7544 standard	5	BIOREF	42
17	Successful tests performed on dual-fuel engines and SOFC, using upgraded bio-oil and pyrogas	5	BIOREF	48
18	Conclusion of the techno-economic assessment study	6	LNEG	36
19	Conclusion of the environmental LCA and social acceptance studies	6	LNEG	42
20	Website online and social media channels (LinkedIn, Twitter) established	7	WIP	M18
21	Introductory conceptual project video available	7	WIP	M15
22	Publication of the final exploitation plan and market assessment for pyrolysis products	7	WIP	M42
23	Detailed characterization of biochar, wood vinegar, and activated modified biochar	7	UHOH	M18

3. Governance structure

PYRAGRAF integrates the necessary disciplinary and interdisciplinary knowledge to bring the project to success. The consortium represents a well-balanced combination of relevant industry supported by research and scale-up experts with proven track-records and targeted roles. The pan-European distribution of the consortium members intends to pick the best available expertise in the several disciplines required, but also to drive a truly representative set of demonstrators, ranging diverse and representative climate, soil, and agriculture paradigms. Table 4 provides a general overview of the partners, as well as their categories and countries of origin.

Table 4. PYRAGRAF's consortium.

Number	Name	Abbreviation	Category	Country
	Coordination			
1	INSTITUTO POLITÉCNICO DE PORTALEGRE	IPP	UNI	PT
	Beneficiaries			
2	LABORATÓRIO COLABORATIVO PARA AS BIORREFINARIAS	BIOREF	RTO	PT
3	KARLSRUHER INSTITUT FUER TECHNOLOGIE	KIT	UNI	DE
4	TURKIYE BILIMSEL VE TEKNOLOJIK ARASTIRMA KURUMU	TUBITAK	NL	TR
5	KUNGLIGA TEKNISKA HOEGSKOLAN	KTH	UNI	SE
6	UNIVERSIDADE DE EVORA	UEVORA	UNI	PT
7	UNIVERSITAET HOHENHEIM	UHOH	UNI	DE
8	ANKARA UNIVERSITESI	AU	UNI	TR
9	LABORATÓRIO NACIONAL DE ENERGIA E GEOLOGIA I.P.	LNEG	NL	PT
10	SIEC BADAWCZA LUKASIEWICZ - POZNANSKI INSTYTUT TECHNOLOGICZNY	LPIT	RTO	PL
11	IDEA SRL	IDEA	SME	IT
12	MICE - MOLDS AND INJECTED COMPONENTS ENGINEERING SA	MICE	SME	PT
13	WIRTSCHAFT UND INFRASTRUKTUR GMBH & CO PLANUNGS KG	WIP	NGO	DE
	Associated partners			
14	carbonauten GmbH	CARBO	SME	DE
15	Agrokraft GmbH	AGROK	SME	DE
16	TOPSOE AS	TOPSOE	LE	DK
17	Câmara Municipal de Vila de Rei	CM Vila de Rei	MUN	PT
18	NIZIP ZEYTIN-ANTEP FISTIGI URETICILERI BIRLIGI DERNEGI	NAZDER	SME	TR

19	Murat Salih	MS	SME	TR
20	Martin Junger Landwirtschaftsbetrieb	MJL	---	DE

Note: UNI – University; NL – National Laboratory; RTO – Research and Technology organization; SME – Small & Medium Enterprise; LE – Large Enterprise; NGO – Non-Governmental Organization; MUN – Municipality.

3.1. Governance overview

PYRAGRAF's management structure reflects the good articulation between the twenty (20) partners (13 full beneficiaries and 7 associated partners). PYRAGRAF's management roles will include an advisory board (with up to 6 members from well-recognised entities linked to bioenergy and solar concentration stakeholders and supply chains), a steering committee (composed of 1 senior representative from each partner), a project manager (from IPP), a management team to work with the project manager (with 3 top researchers from different partners), a scientific and technical coordinator (from BIOREF), an innovation manager (from KTH), an exploitation manager (from MICE), and a D&C manager (from WIP). PYRAGRAF's management structure is represented in

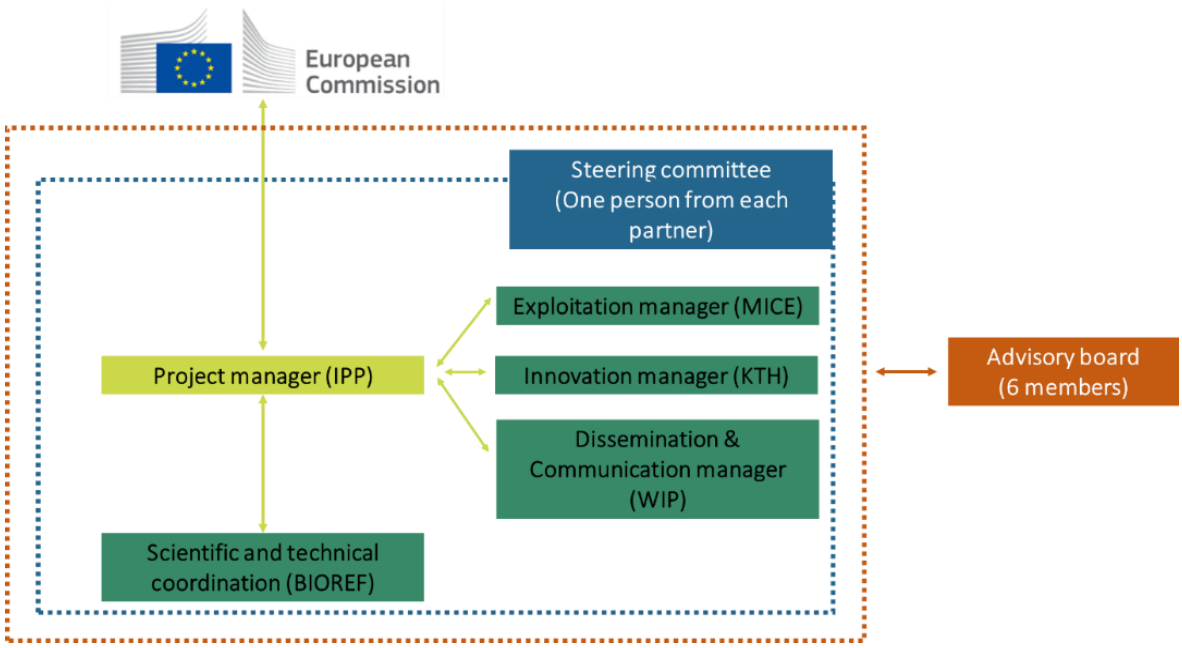

Figure 4. Description of PYRAGRAF's management structure.

3.2. Roles and responsibilities

Steering committee (SC): The SC is the body responsible for taking key decisions throughout the whole project lifetime. Specifically, whenever an unexpected issue or delay occur, the SC and the PM (appointed by the project's coordination) will be responsible for identifying and taking corrective measures to ensure an effective use of budget and on time deliveries. The SC will be composed of one senior representative of each beneficiary (13 members in total), which is authorised to deliberate, negotiate, and decide on all matters related to the SC.

Names of each beneficiary representative will be available after appointment, as soon as possible.

Project manager (PM): The PM, representing the project's coordination, acts as the intermediary between all parties and the granting authority and supervises project execution and the fulfilment of its goals. Catarina Nobre, from IPP, will act as PM having the following responsibilities:

- → Monitoring the overall progress regarding milestones and deliverables.
- → Operationalization and timing of all activities in the project.
- → Identification of any unanticipated risks.
- → Acting as the centre of communication between internal and external stakeholders.
- → Supervise the preparation of deliverables, preform final revisions and submission in SyGMa.
- → Overview of the technical interim and final reports.
- → Being responsible for PYRAGRAF's relevant data management.
- → Administering the financial contribution of the granting authority and fulfilling the financial tasks described the CA.
- → Ensuring the timely submission of financial reports.
- → Monitoring compliance by the parties with their obligations under the CA and the GA.

Scientific and technical coordinator (STC): The scientific and technical coordinator will be Gonçalo Lourinho from BIOREF. Technical monitoring will be performed by the STC, in cooperation with the PM and WPLs. The scientific or technical coordinator will ensure:

- → Consistent coordination of the different research teams across the project activities.
- → Monitoring of the project's implementation, including assessment and evaluation of the overall performance of the project.
- → Collaborating with the PM in continuous quality assurance and timely submission of deliverables and reports.
- → Collaborating with the PM regarding accurate risk analysis and contingency planning.
- → Technical management meetings will be held with regular intervals, to assess the degree of completion of work, including technical results and deliverable preparation. This continuous quality watch is performed by the STC and the PM and will be reported in the periodic progress reports, which are the responsibility of the WPL, and should be delivered every 3 months by e-mail addressed to the STC and the PM.

Management team (MT): The management team, composed by the PM, STC and 3 researchers (tbd) from the partners with higher PMs allocated to the project (KIT, TUBITAK and LNEG), will assist in day-to-day project management activities.

Innovation manager (IM): In general terms, the innovation manager is responsible for the promotion and maintenance of the innovative nature of the project and will supervise aspects related to the protection of intellectual property. The IM will be Klas Engvall from KTH.

Exploitation Manager (EM): The EM for PYRAGRAF will be Nuno Gomes from MICE and will be responsible for the supervision of exploitation strategy for the final project outputs.

Dissemination and communication manager (DCM): Rainer Janssen from WIP will be PYRAGRAF's DCM and will oversee the execution of activities related to D&C throughout the project.

Work package leader (WPL): WPLs will ensure the successful execution of the activities carried out in all project tasks for their corresponding WP. WPLs will be responsible for interacting and informing the PM and STC of the activities that are being carried out in their WP, including obtained results, deliverable writing, and all technical and financial issues. WPLs are responsible for organizing technical meetings and ensure communication with the partners working in their WP. The PM or the STC must be present in the scheduled technical meetings. WPLs are also responsible for delivering technical interim reports on their WP every 3 months, sent by e-mail to the MT.

Advisory board (AB): The AB will be composed of up to 6 members from well-recognised entities. This body will support the activities planned for PYRAGRAF, it's composing entities can be industries, stakeholders, potential financiers, and technology experts, with expertise in different domains related to pyrolysis and pyrolysis products value chains (e.g., biomass to energy conversion solutions, market analysis, production of energy crops and supply chains, and fuel deployment). The AB will be defined, and invitations will be sent after the first SC meeting.

4. Project monitoring and communication

4.1. Reporting

4.1.1. General reporting

PYRAGRAF has three reporting periods covering M1-18 (periodic report), M19-36 (periodic report) and M37-48 (final report). Reports are due after M18, M36 and M48 within 60 days following the end of each period. All reports are coordinated and monitored by the PM (assisted by the whole MT) who also provides guidance on required contents and style. The periodic reports will generally include the following parts:

- → Progress reports per WP (a coompilation of the technical interim reposts by each WPL).
- → List of publications.
- → List of dissemination and networking activitie.
- → Deliverable and milestone table.
- → Table presenting planned versus actual resource usage (staff effort) per partner.

- → Periodic financial report with a) individual financial statement for the reporting period concerned, with all eligible costs in detail (actual costs, unit costs and flat-rate costs, for each budget category); b) Justifications for the use of financial resources by each beneficiary; c) periodic summary financial statement, which includes the request for interim payments, created automatically by the electronic exchange system.

The periodic reports provide an overview of the progress made towards the objectives of each WP, as well as the work performed and results achieved within the reporting period. Whenever applicable, these reports will also specify deviations from the work plan and detail corrective actions to be taken. Moreover, they will present plans for the next work period. Report writing will be mainly managed via the project's MS Sharepoint/MS Teams. The PM is responsible for requesting and reviewing the reports, for verifying their accuracy and completeness and submitting them to the EC. Contributions are expected from all partners being monitored by the WPL. Revisions for the report's final acceptance are managed by the MT. The periodic reports are also always written with the aim to substantiate the corresponding finantial statement for the period under review.
Templates, instructions and timings about project reporting will be made available on the project's repository. All the information required to prepare these reports must be made available to the MT, 2 months prior to the submission deadline and the MT must submit the reports do the SC for validation 3 weeks prior to the submission deadline.
The final report (M37-48) must present:

- → An overall presentation and discussion of the results.
- → Current and future exploitation of the results.
- → Communication and dissemination results throughout the project.
- → Project's technical, economic, and social impacts
- → Final financial statement that must include a) a summary financial statement, consolidating the individual financial statements for all reporting periods, and including the request for payment of the balance (created automatically); b) certificates on the financial statements for each beneficiary, when total contributions are above 430.000 €.

4.1.2. Internal reporting

Internal reporting to monitor PYRAGRAF's progress, will be done via technical interim reports and minutes from each meeting.
As previously stated, technical interim reposts will be the responsibility of each WPL, concerning their corresponding WP. WPLs must assure communication between all partners involved in the tasks, and present a report every 3 months, to be sent to the MT. In turn, the MT will assess these reports, and they shall be further discussed in the next SC meeting. Templates for the technical interim reports will be made available on PYRAGRAF's MS Sharepoint.
The person conducting each meeting (CM, SC, TM) will delegate the writing of the minutes, so that each partner has a turn on this task. After writing, the minutes should be sent to the MT for validation, and then shared via mail using the link on which the document is store on PYRAGRAF's MS Sharpoint. Minutes should be ready and shared a maximum of 1 week after the meeting took place.

4.2. Communication

E-mail: The e-mail will be selected as the main communication channel between the PM, all partners, and all other management bodies. E-mails can be used to transmit both formal and informal information related to the project (e.g., meeting dates and agendas, minutes, administrative business, technical/financial/deliverable reminders, document preparation, etc.). A contact list is already available on PYRAGRAF's repository. The PM is responsible to keep the list updated, whenever a team member changes, or when there are new additions to the project. To use of this communication tool, all partners must make use of the following guidelines:

- → The subject of the message must be explicit about the contents included in the body of the e-mail and must always start with the project's name with square brackets (e.g., [PYRAGRAF] – "Subject….".
- → The e-mail must be addressed only to the directly involved partners and "cc" the PM.
- → In the event of sending a file, the sender of the e-mail should upload the file to the project's repository and use a link that can be placed in the e-mail, for direct access.

Microsoft Sharepoint: MS Sharepoint will be used as a repository of documents and other information related to the project, to facilitate the internal exchange of information among all partners and to keep track of the progress of activities. The repository will be used to store pertinent documents such as presentations, templates for reports and timesheets, administrative documents to be filled out or for information purposes, deliverables, technical documentation, project results, and project news. Moreover, it can be used as a common environment for day-to-day work using MS Teams, enabling different collaborators to work and upload files simultaneously, and therefore keeping the information always up to date and accessible for everyone. Access to PYRAGRAF's MS Sharepoint must be requested to the PM, who will keep the repository organized. File nomenclature must be explicit and have the date of document creation and the version number (e.g., D1.6_project_management_plan_29082023_V1.docx).

4.3. Meetings

Consortium meetings (CM): PYRAGRAF as a total of 8 in-person consortium meetings (CM) throughout its 48 months. CMs will take place 2 timer per year (preferably), each in a country from a beneficiary, and a maximum of two representatives from each beneficiary must be present. Each PYRAGRAF beneficiary has budget allocated for the hosting or co-hosting of these CMs. Table 5 shows preliminary suggestions on dates, locations, host and co-hosts for the project's CMs (it includes the kick-off meeting).

Table 5. Preliminary suggestions on CMs location and date.

Date	Country	City	Host	Co-host (s)
M1	PT	Portalegre	IPP	---

M7	DE	Munich	WIP	KIT, UHOH
M12	TR	Istanbul	TUBITAK	AU
M18	IT	Palermo	IDEA	---
M24	SE	Stockholm	KTH	---
M30	TR	Ankara	AU	TUBITAK
M36	DE	Stuttgart	UHOH	KIT, WIP
M42	PL	Poznan	LPIT	---
M48	PT	Lisbon	BIOREF	IPP, MICE, UÉVORA, LNEG

Hosts and co-hosts will be responsible for overall meeting organization (in a timely manner), including venue, agenda, visits, team building events or meetings with stakeholder. CMs will be focused on a) summarizing the project's developments; b) update (when needed) actions and measures to meet the project's objectives; c) discuss the structure and organization of upcoming project work WP; d) discuss dissemination, management and financial issues for the upcoming period. CMs can also include presential technical meetings, lead by WPLs, to discuss with more detail the work in each WP and correspondig tasks.

SC meetings (SC): SC meetings will be held every 3 months via MS Teams. This periodicity relates with the delivery of technical interim reports by WPL, as described in section 3 of this document. SC meetings are progress meetings of the project's global perspetive. The PM will prepare a meeting agenda, and send it to the SC 3 days before each of these meetings. Every vote that takes place on SC meetings needs the presence of 2/3 of the SC to be approved or vetted.

Technical meetings (TM): These meetings are intended to be carried out between WPL and the partners working on each WP, via MS Teams or in the context of a technical visit between parteners. These meeting can be periodic or as needed, with its rules defined by the WPL and the partners working on each WP, and duly communicated to the PM. Scheduling of these meetings should be performed via Doodle. The PM or the STC must always be present in these meetings. These meetings are meant to a) discuss and decide on scientific and technical issues of PYRAGRAF; b) track the progress of activities and milestones in each WP; c) build the technical interim reports.

Review meetings (RM): RMs will occur under the request and conditions established by the PO. RMs are aimed to presenting a regular status of the overall project and tracking its progress, in which possible proposals defined in SC meetings may be presented for negotiation (e.g., changes in the GA and CA, and budget updates). Periodic and final reports submitted to the granting authority can be discussed. Additionally, problems detected during

project execution can be presented for a possible resolution. These meetings require the presence of the PM (coordinating beneficiary), accompanied by other project partners if necessary.

5. Financial management

5.1. Financial administration

The PM administers the financial contribution of the EC to PYRAGRAF. IPP transfers payments to the partner's bank accounts without undue delay and in conformity with the rules laid out in the GA. The PM also monitors the submission of all financial statements (Annex 4 of the GA) and handles with SC any kind of re-allocation of funding within the consortium. Table 6 shows the project's pre-financing details.

Table 6. PYRAGRAF's pre-financing details.

Beneficiary	Total funding	Pre-financing
IPP	994 066,25 € (16%)	480 432,22 €
BIOREF	604 573,75 € (10%)	292 190,49 €
KIT	659 476,25 € (11%)	318 724,87 €
TUBITAK	585 437,50 € (10%)	282 941,94 €
KTH	452 262,50 € (7%)	218 578,47 €
UEVORA	302 445,00 € (5%)	146 171,67 €
UHOH	492 375,00 € (8%)	237 964,84 €
AU	503 165,00 € (8%)	243 179,64 €
LNEG	387 718,75 € 6%)	187 384,47 €
LPIT	324 397,50 € (5%)	156 781,31 €
IDEA	223 912,50 € (4%)	108 216,91 €
MICE	391 370,00 € (6%)	189 149,12 €
WIP	207 025,00 € (3%)	100 055,18 €
TOTAL	6 128 225,00 € 100%)	2 961 771,14 €

Moreover, the PM has collected bank details from all partners who are requested to inform the PM about updates or other changes. Beneficiaries will be notified about upcoming

payments in advance with reference to the amount of distribution. PYRAGRAF's payments are identified in the GA. Project management activities will also largely focus on cost reports including the preparation, collection and review of partners financial statments and cost justifications, as described in section 3 of this document.

Information on the in/eligibility of costs can be found in PYRAGRAF's GA. To help with financial management, the PM will prepare and upload to the project's repository, an excel file containing a table to track down costs and corresponding justification, for each project beneficiary.
For financial reporting, the PM will give guidance by a) facilitating the collection of financial figures for the relevant reporting period, reminding each beneficiary to send their details in a timely fashion; b) by informing about required documents such as Certicates of the Financial Statement; c) by clarifying how to enter figures into SyGMa; d) by reviewing the cost justifications for consistency and completeness. Advice on financial issues can be requested via e-mail to the PM and to IPP's project management team (these contacts are available on the project's contact list on MS Sharepoint). When finalized, all the financial information from each partner is uploaded into SyGMa, financial statmentes must be electronically signed. Revisions requested by the EC will be organized and submitted without delay via the PM.

5.2. Resource allocation

The allocation of resources is controlled by each partner with the supervision of the PM with the MT. Partners are asked to document the distribution of PMs for their organisation, via timesheets that will be made available on the project's MS Sharepoint. The timesheets are reviewed by the PM and the MT mainly to see whether staff effort is in line with the DoA. The PM will request that PM allocation be rearrange by tasks by each task leader jointly with the WPL. This distribution will be integrated into the timesheets designed by the PM for the consortium's reporting of PMs. Each beneficiary will need to complete with their actual use of resources every 6 months. This data collection allows the PM to track the resource allocation per partner throughout the project and provides a detailed summary of planned *versus* actual resources. Each partner will also be asked to justify any major over/underuse of resources to make sure that the deviations from the planned resources will not result in an overall delay of the project or otherwise jeopardize the project's objectives.