

## TERMS OF REFERENCE AND TECHNICAL SPECIFICATIONS

### I. General information

Assignment name	Assessment of Biomass on Techno-Economic Potential Align with RUPTL 2025-2034 in Selected Areas of Sulawesi Region.
Beneficiary	Directorate of Bioenergy, Ministry of Energy and Mineral Resources (MEMR)
Country	Indonesia
Total estimated level of effort	22 person-months

### II. Background, Context and Rationale of Activities

#### Context of Biomass Project Development in Indonesia

The development of on-grid biomass power project in Indonesia remains underutilized despite its potential to drive sustainable development and a just transition. The sector is crucial for electricity generation industry but faces investment risks, technical barriers, and regulatory gaps. To expand the capacity of biomass power plant requires a robust legal and economic framework to ensure sustainability, biodiversity protection, and increased electricity contributions.

The current biomass utilization and market in Indonesia consists of as traditional firewood for rural household, existing captive cogeneration plants in agro-industries (pulp & paper, palm oil, sugarcane, wood processing), export products (palm oil shell, coconut shell, wood-pellet), PLN's co-firing program, on-grid biomass power plant, small-medium industries, and big-industries for decarbonization program.

Some of biomass have high economic value (palm oil shell, wood-pellet) and as export product that can reach beyond 100 USD/ton, especially during low-crop session or higher demand. Some of biomass still as a waste, do not have value, and remain as a cost for the owner (paddy straw, palm oil empty fruit bunches, etc). The result of several studies concludes that biomass from dedicated energy plantation compare to biomass residues tends to have higher cost of production, and depend on the scale of the energy plantation.

Perpres 112/2022 still treat biomass feedstock for PLTBm as a single tariff despite the fact of different kind of biomass as explained above. The current PLTBm tariff already consider the location factor, but

sets as a fixed tariff for the entire project lifetime with staging price scheme, while the biomass market and price in the future can be increasing. There is no specific governance in the biomass product sector, and biomass prices base on supply and demand, and the market competition.

MEMR released new National Electricity Development Plan 2025 (RUKN 2025) and projected PLTBio (bioenergy power plant) will contribute to 4.5 GW capacity. PLTBio consist of PLTBm (biomass), PLTBg (biogas), PLT BBN (liquid biofuel) and PLTSa (municipal solid waste). If RUKN 2025 projection include the captive power then the gap of PLTBio would only 1.4 GW need to be developed by 2060.

MEMR also released new electricity business plan or RUPTL 2025-2034 and plan to develop biomass power plant with total capacity quota of 450.7 MW and 38 of listed projects. The new capacity quota consists of Sumatera with total quota of 47.2 MW, Kalimantan 63 MW, Sulawesi 200 MW, Maluku 100 MW, Nusa Tenggara 15.5 MW, and Papua 20 MW as shown on below table. These new quotas will serve as new biomass market in Indonesia for the next ten years of development, and estimate would need quantity of biomass at least 5 million ton annually.

No	Region	RUPTL 2021-2030	RUPTL 2025-2034
1	Java-Madura-Bali	-	-
2	Sumatera	84	47,2
3	Kalimantan	76	63
4	Sulawesi	-	200
5	Maluku		105
6	Nusa Tenggara		15.5
7	Papua		20
	Maluku-Papua-Nusa Tenggara	106	
	<b>TOTAL</b>	266	<b>450,7</b>

RUPTL allocated capacity quota for PLTBm in each grid of PLN base on demand and information on feedstock availability, but there is no detail information on the specific type of biomass feedstock, sources, quantity, price, etc. There is no specific biomass supply roadmap or strategy that could guide to reach the target of RUEN 2025 toward the NZE by 2060, or in short/mid-term to reach the new RUPTL target to develop PLTBm with total of 450.7 MW.

MEMR in 2024 updated the national bioenergy mapping and resulted theoretical potential of 57 GW. The potential resources are from residues of plantations, agricultures, agro-industries, animal farming, and municipal solid waste. The potential dominated from the residues of plantation and mills of palm oil industry counted 49%, while agricultural residues consist of paddy and corn counted 20%. These theoretical potentials counted as a gross potential and some of residues are already utilized especially in agro-industrial mills. It would need further and detail biomass feedstock assessment to understand the techno-economic and market potential and use as potential feedstock for development of biomass project.

### Rationale of Activity

MEMR in 2023 updated the national biomass mapping and resulted theoretical potential of 95 GW. There is a need for detail assessment of biomass resources to map the techno-economic or marketable

potential and can be used by utility as the reference for the PLTBm procurement or other biomass project development.

Detail assessment of biomass resources to study the feasibility of techno-economic potential would need robust methodology using international best practice combined with GIS approach and field survey verification to produce reliable data.

The assessment of biomass resources will evaluate the availability of local specific biomass in terms of different kinds of variety, characteristic, sources, ownership, quantity, quality, coverage area, land status, seasonal change, supply chain, local prices, local culture, production trend historic, competition, market orientation, and sustainability aspect.

AFD group supports bioelectricity projects that deliver strong local economic and social benefits, particularly in rural areas, while maximizing energy efficiency through cogeneration when feasible. Projects must prioritize biodiversity protection, climate resilience, and the sustainable use of biomass, ensuring minimal negative impacts on soil, water, and ecosystems. A territorial approach is emphasized, favoring local biomass supply chains (within ~100 km) and sustainable harvesting practices. The guidelines require robust carbon accounting, avoiding carbon debt and ensuring net GHG reductions. Pre-existing biomass uses (e.g. for food, forage) must be preserved, and supply chain traceability and sustainability especially for forest or imported biomass—must be ensured through certification and best practices.

This output of activity would produce database and priority list of techno-economic and market potential of biomass as feedstock for developing a sustainable biomass project power plant or other biomass project development. The activity will also develop a guideline on how to assess the biomass resources include use of geographic information system (GIS).

As biomass for electricity generation is one of the main focuses of this study, PLN's active involvement is essential to ensure both ownership and practical use of the study's results. PLN's participation should facilitate a coordinated approach with EBTKE for the next steps in developing sustainable bioenergy, particularly in relation to the RUPTL project pipeline. To this end, it is strongly recommended to establish a joint working group comprising representatives from EBTKE and PLN. This group would serve as the primary platform for coordination, information exchange, and joint validation of key stages and deliverables of the study, thereby ensuring alignment between policy objectives and operational implementation.

### **Cooperation Context and Calls for the Consultant**

This activity is part of the IETF program. The IETF (€14.7M, EU-French funded) is a technical assistance program designed in partnership with Indonesian stakeholders to support the country's clean energy transition. It builds on the Just Energy Transition Partnership momentum to help advance fair and inclusive policies, while facilitating the preparation of renewable energy and transmission projects.

Under the IETF Program, the Ministry of Energy and Mineral Resources (MEMR) and AFD have signed the Terms of Reference (ToR) on policies for sustainable production of bioenergy to advance

Indonesia's bioenergy sector by addressing regulatory gaps and technical challenges. This initiative specifically focuses on the development of sustainable biomass project based on agricultural residues with a strong emphasis on ensuring compliance with environmental and social safeguards in line with AFD and European Union standards.

The main objective of the TOR is to support MEMR and Indonesian stakeholders on the sustainable biomass development to preserve the biodiversity, environment, and maximize social benefits. One of the main activities on 2025 are provide assessment of biomass potential and feedstock supply chains, focusing on mapping agricultural waste biomass in two provinces/regions.

To carry out this study, the program calls for qualified Consultant with expertise conducting biomass resources assessment. The Consultant will be responsible for conducting detail assessment, develop guideline, including site survey and verification as written on this Technical TOR. The work will in close coordination with EBTKE Bioenergy and related stakeholders.

### III. Objectives, Scope of Work, Methodology, and Expected Results

#### 1) Objective

The objective of the activity is to conduct an assessment of biomass resources in the selected two provinces in Sulawesi region as a priority or another potential region in Indonesia. The assessment of biomass resources will study and evaluate the techno-economic and market potential of biomass resources as main feedstock for the development of sustainable biomass power plant project.

The assessment of biomass resources assessment will study and evaluate the availability of local biomass in term of type of biomass, characteristic, sources, ownership, quantity, quality, coverage area, land status, seasonal change, supply chain, competition, local prices, local culture, production trend historic, market orientation, and sustainability aspect.

The result of study would provide the availability of biomass feedstock that could trigger small-medium biomass project development based on RUPTL 2025-3034, especially biomass residues from agricultural to preserve the biodiversity, environment, and maximize the local social-economic benefits especially on the biomass collection.

#### 2) Specific Objectives of the Activity

**Scope of biomass considered:** agricultural residues, agro-industrial residues, residues of wood-based industries or others potential biomass resources. Excludes: forestry biomass, all urban or industrial wastes such as RDF, MSW.

**Scope of energy target:** electricity from biomass for auto consumption or for export to the electricity grid, heat production for biomass for industrial purpose. Excludes: biofuels of any kind, co-firing, conversion from coal to biomass.

**Location:** Sulawesi region and selected two provinces or another potential region.

The regions of the study will be in Sulawesi as a priority. From the results of first phase of biomass screening and mapping as described on the detail assignments section, it will select two focus provinces to conduct detail assessment of biomass resources.

The specific objectives of the activities describe as follow:

1. Carry out biomass resources screening in Sulawesi region to select two provinces for detail activities of biomass resources assessment.
2. Carry out detail biomass resources assessment, site survey, interviews and verification in two selected provinces to evaluate the feasibility of techno-economic and biomass market schemes on the selected of two provinces or areas.
3. Develop detail biomass techno-economic and market potential database, and supply chain biomass on Ms. Excel basis and detail GIS map in two selected provinces.
4. Conduct comprehensive analysis and develop priority list on techno-economic and biomass market potential project, including specific recommendation on each project potential in two selected provinces.
5. Develop guideline or manual book on the methodology of conducting biomass resource assessment, including the use of GIS application and biomass financial analysis.
6. Training the use of biomass database, GIS map, and the guideline on how to conduct biomass resources assessment, include GIS tool and financial analysis to EBTKE Bioenergy team and related stakeholders.
7. Dissemination to the public on the results and outputs of the activities.

### **3) Methodologies**

The methodologies and specific activities would include conducting comprehensive desk study, data collection, meetings with related stakeholders (EBTKE Bioenergy, PLN, Ministry of Agriculture, Ministry of Forestry, Ministry of Industry, Local Governments/Authority, biomass owners and suppliers, local farmers/cooperatives, agro-mill owners, etc.), data analysis, GIS mapping, site survey and data verifications, develop biomass database, biomass financial analysis, develop a guideline or manual book, events of training and dissemination, reporting and documentations.

### **4) Expected results**

Main outputs of activity would produce biomass database on techno-economic potential, GIS map, and priority list of techno-economic and market potential of biomass as feedstock for developing a sustainable biomass project power plant or other biomass project development based on RUPTL 2025-2034. The activity will also produce a guideline or manual book on how to assess the biomass

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resources include use of geographic information system (GIS) analysis, biomass financial analysis, trainings and dissemination of results.

#### **IV. Scope of Works and Description of Assignment**

##### **1) Pricing Instructions for Candidates**

The contract consists of two elements:

###### **1. Fixed-Price Element**

This includes on the Task 1, Task 2 and Task 3 as described in the paragraph “scope of works - fixed-price element” below. Candidates are invited to submit their best fixed-price offer for this part of the contract, to be detailed in the fixed-price element tab of the financial annex to the contract.

###### **2. Order-Based Element**

An order-based element is included for kick-off meetings, training, and dissemination event, as it is not yet confirmed whether these events can take place at MEMR premises. This provides flexibility to hold them at alternative venues, such as hotels.

It covers costs related to organizing kick-off meeting, training, and dissemination event, including: room rental, catering, translation, audiovisual equipment, event materials printing, moderation, logistics coordination. The maximum amount for the order-based element is fixed at € 20,000 (excl. VAT). No minimum order is guaranteed.

The number of participants and final choice of venue will be validated by the contracting authority before the meeting.

The cost of each event will be calculated using the unit prices provided by the candidates in the financial annex of the contract.

##### **2) Scope of Works - Fixed price element**

The specific scope of works and description of the assignments for the Consultant includes the following critical tasks:

###### **Task 1. First phase on Biomass Resources Screening.**

The expected output of Task 1 is selection of two provincial focus area study in region of Sulawesi base on certain criteria and ranked of biomass potential list. The biomass resources screening will use the existing national database of biomass theoretical potential map manage by EBTKE Bioenergy and the project screening base on but not limited to the list of biomass project on RUPTL 2025-2034 and other identified potential project in the market. The detail scope of work as follow:

1. Carry out kick-off meeting with EBTKE Bioenergy and related stakeholders with the objectives and target as follow:

- To present the workplan, methodology, and outputs of activities with EBTKE Bioenergy, PLN and related stakeholders, and to get approval from EBTKE Bioenergy especially on the workplan and methodology.
- To get inputs, engagement, and public data and information access from stakeholders, especially from EBTKE Bioenergy on national database of biomass theoretical potential, PLN MEB on the list of biomass projects and updated list of DPT on biomass project, Ministry of Agriculture on the updated agriculture production statistics, Ministry of Forestry on the updated list of permitted HTI/HGU with detail location and contact of companies, Ministry of Industry on the list of agriculture mills (rice mills, corn processing mills, etc), Local Government/Authorities, biomass association on the projects potential and lists of biomass suppliers, including contact person from each related stakeholders.
- Prepare, organize and manage overall of kick-off meeting, including but not limited to invitation with close coordination with EBTKE Bioenergy, agenda, kick-off materials (PPT presentation, minutes of meetings, list of attendees, the venue/room, meals, audiovisual equipments, translator and equipments if needed, photo documentation, etc), presentation and moderation, and prepare the event reports.

2. Conduct biomass resources and project screening based on theoretical potential already performed by EBTKE Bioenergy, include collection of data and information, comprehensive data analysis, develop criteria selection of provinces, and rank the list of all provinces base on the certain criteria. The main criteria of the provincial selection are but not limited to base on biomass supply side (agriculture residues, permitted HTI/HGU, etc), demand side of biomass, infrastructures condition, project risks, local culture and local socio-economic benefit.

3. Detail data and information of first phase are included but not limited to as follow:

- Supply side of biomass residues: type of biomass, quantity (ton/year), location base on district level (*kabupaten*), sources, coverage area, condition of feedstock (collected or distributed), local status of usage (for sell, burn, dump, etc), biomass ownership, land status.
- To calculate the specific quantity of biomass production could use biomass mass-balance approach using academic or journal references of the production ratio.
- Demand side: on-grid biomass project potential on RUPTL, off-grid biomass potential, other market.
- Infrastructure: road access condition, ports access, electricity grid system (20 kV/70 kV/150kV) and substation, local trucking transport, etc.

4. Develop general biomass database on Ms. Excel basis and GIS map.

5. The final output of first phase is the selected of two provincial area study in region of Sulawesi for detail biomass resources assessment. The selection base on two highest ranks of the list of all provinces base on the defined criteria.

6. Prepare progress report and PPT material of Phase 1, include provide detail data collection, information and GIS map on the annexes. The softcopy off all material including biomass database and GIS will be shared on the selected server.

## **Task 2. Second phase on detail biomass resources assessment, site survey, and verification**

The expected output of Task 2 is to evaluate the feasibility of techno-economic and biomass market schemes on selected of two provinces for the development of sustainable biomass power plant project.

The assessment of biomass resources will evaluate the local availability biomass in term of type of biomass, characteristic, sources, ownership, quantity, quality, coverage area, land status, seasonal change, supply chain, competition, local prices, historical production trend, market orientation, local culture on biomass utilization, and sustainability aspect.

The result of study would provide the availability of biomass feedstock that could trigger biomass project development and to preserve the biodiversity, environment, and maximize the local social-economic benefits especially on the biomass collection. The detail scope of work as follow:

1. Carry out comprehensive and specific data collection from related sources and stakeholders, include but not limited to, agriculture area and mills (rice mills, corn processing mills, etc), other plantations (coconut, candlenut, etc), permitted HTI/HGU, biomass project list on RUPTL, existing biomass suppliers, etc. The data collection includes site survey and data verification.

2. The detail data and information of second phase are included but not limited to as follow:

- Supply side of biomass residues: type of biomasses, quantity (ton/year), historical production trend (prefer for 10 years but at least five years), quality and detail characteristics of biomasses, specific sources (biomass processing residues, biomass harvesting residues, biomass energy plantation), land status (own land, rent, license, etc), biomass ownership (fully own, partly own, etc), condition of feedstock (collected and ready use, collected but need processing, need collection and processing), location base on specific coverage economical area, distance to the demand, local status of usage (for sell, burn, dump, etc), local prices at source point, need of pre-treatment, seasonal change, supply chain, competition, local culture on biomass utilization, market orientation, and sustainability aspect.
- To understand the specific quality and detail characteristics of selected prospective biomass, such as rice straw, rice husk, corn stalk, etc (anticipated at least two type of selected biomass), it would need to take a laboratory analysis of the biomass samples, include proximate, ultimate, total moisture (as received), ash content (sulfur, chlorin, kalium/potassium, etc), and ash fusion temperature.
- Demand side of on-grid biomass project potential on RUPTL, include project size in MW, need of annual biomass volume, estimate range of distance to biomass project or point or distance of interconnection to grid system.



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- Demand side of off-grid biomass potential and other market include project size (MWe or MWth), need of annual biomass volume, estimate range of distance to biomass project.
  - Infrastructure: road access condition, ports access, electricity grid system (20 kV/70 kV/150kV) and substation (as reference, for plant capacity < 5 MW can be tap to 20 kV, and for > 5 MW prefer close to the substation), local transport mode (truck, boat, etc), price of delivery (IDR/ton/km) include cost of handlings (loading and unloading), local price of transport fuel (IDR/liter), local labor cost (minimum salary rate or UMR on IDR/month), availability of labor of biomass collection and handlings, etc.

3. Develop detail biomass database on Ms. Excel basis and detail GIS map on above variables. The GIS map should include of available to public on map layering of other land use such as, forest area, land use, grid transmission and distribution system, substation, public road access, port, coverage area of biomass sources from specific agriculture, coverage area of permitted HTI/HGU, etc). Basically, GIS map will help to understand all type of data and information of demand side, supply side, infrastructures, biomass project area/distance boundary, etc, into one spatial data map. The GIS tool will use specific application aligned with the existing owned by EBTKE Bioenergy.

4. Conduct comprehensive analysis and develop priority list on techno-economic and biomass market potential project, including specific recommendation on each project potential. The analysis consists on the aspects as follow:

- Evaluate the quantity analysis of biomass supply and specific demand, and economic boundary or coverage area of biomass collection and supply to the project site. The biomass supply should be available, secure and sustainable in the long term for at least 20 years of operation. The quantity of biomass available should be more than the demand needs, and should be secured in case of any risks of productivity, seasonal and climate change.
- Once the availability of biomass and ownership status have been clarified, it is necessary to analyze the general condition of the source of biomass (long term agriculture or plantation, or processing mills production, or third party supplying the raw materials. This is necessary to evaluate the long-term sustainability of biomass availability until the typical project lifetime up to 20 years.
- If biomass feedstock still needs collection and processing/pre-treatment scheme, it would need deep analysis on the local social-economic benefits on the biomass collection (collection scheme, business model, and institutionalization, including benefiting the national program on village cooperative), and estimate the final biomass production cost (IDR/ton), including the delivery and handling at the propose project site.
- With the inputs data on local biomass price or biomass production cost, analyze the financial-economic feasibility or impact of fuel cost (Component C of the tariff structure) compare to the existing biomass power plant tariff base on Perpres 112/2022. Are the tariffs still attractive, or at what level the tariff should be set to make the project more attractive? Analysis also comparing with the electivity production cost of local grid system especially with existing diesel generator or other high fossil fuel prices. The analysis would need to prepare financial analysis spreadsheet or tools and conduct biomass financial analysis and assessment.

- Evaluate the quality of specific biomass, whether it would need pre-treatment, specific handling for delivery, specific technology conversion and processing based on specific material content, etc.
- Ideally the biomass sources are owned by the biomass project owner, but most cases supply by other parties. If coming from the third parties, then analyze the possibility of condition of the long-term biomass as a fuel supply agreement (FSA), business schemes and complexity, projection of biomass price escalation, seasonal change of supply (low crop season vs high crop season, storage management, supply chain, including the project risks as biomass supplier.
- Analyze local supply chain, existing local competition, market orientation, any impact and safeguard to local social community and environmental.

5. The main output of this task is the resume and conclusion based on the result of comprehensive analysis of No 1 – 4 above, with identified priority list of biomass project location.

6. Prepare the progress report and PPT material of Phase 2, include provide detail data collection, information, financial analysis and GIS map on the annexes. The softcopy of all material including biomass database, financial spreadsheet, GIS, etc will be shared on the selected server.

### **Task 3. Final phase on activity of biomass resources assessment**

The expected output of Task 3 is to prepare the final results of assessment of biomass resources on techno-economic and market potential align with RUPTL 2025-2034, including main results of comprehensive analysis of biomass resources assessment in two selected provinces, develop guideline or manual book on methodology to conduct biomass resource assessment, including the use of GIS methods, financial analysis, training the use of database and GIS map, guideline book, prepare the final reports and dissemination of the outputs. The scope of work will include:

1. Prepare the final technical report based on the result of Task 1 and Task 2.
2. Develop guideline or manual book on methodology to conduct biomass resource assessment, including the use of GIS application, financial analysis, etc. The guideline book basically documented the objective of the activities, the scope of works, methodologies, steps of works, conducting detail analysis, and summarize the result. This guideline in the future could be used or adopted by EBTKE, PLN or other stakeholders on conducting biomass resources assessment in other areas. The final guideline or manual book should get approval from EBTKE Bioenergy, and AFD.
3. Training the guideline on how to conduct biomass resources assessment, the use of biomass database, biomass financial analysis, and GIS map to EBTKE Bioenergy team, PLN and related stakeholders. The output of the biomass database, GIS map, and guideline of biomass resources assessment will be arranged to be ready for publication on EBTKE website for the public use, and would need close coordination with technical Team from EBTKE Bioenergy.

Prepare, organize and manage the overall training activities, including but not limited to invitation with close coordination with EBTKE Bioenergy, agenda, training materials (PPT presentation, minutes of meetings, list of attendees, the venue/room, meals, audiovisual equipments, translator and

equipments if needed, photo documentation, etc), training presentation and moderation, and prepare the event reports, including questionnaires to the participants on the overall result and organization of the training event.

4. Dissemination to the public on the result and output of the activities. The forum of dissemination will arrange later on with close coordination with EBTKE Bioenergy team. For the dissemination forum, the Consultant is also expected to prepare, organize and manage overall dissemination event, including but not limited to invitation with close coordination with EBTKE Bioenergy, agenda, dissemination materials (PPT presentation, minutes of meetings, list of attendees, the venue/room, meals, audiovisual equipments, translator and equipments if needed, photo documentation, etc), presentation and moderation, and prepare the event reports.

5. Prepare and finalize the final activity report, including a two pages executive summary. The activity report consists of all activity report during Task 1 and Task 3, which are not covered on the technical report, including all minutes of meetings, documentations, field activity report, training report, etc.

As part of the expected deliverables for this study, the consultant shall comply with AFD's visibility and reporting guidelines. This includes:

- Using the official PowerPoint and Word templates featuring the logos of AFD, Expertise France, IETF and the European Union for all deliverables;
- Providing an executive summary of 2–5 pages, suitable for internal use and communication with the European Union at the end of the assignment (included in the final report);
- Preparing a 2-pager communication note using AFD's official format, to be submitted for joint validation by MEMR and AFD prior to publication or external dissemination. This note will summarize the outputs of the study and key takeaways; it will be used for communication purposes.

### **3) Scope of Works – Order-based element**

If the kick-off, FGD, or dissemination forum is held in a hotel, the service provider shall be responsible for managing all meeting logistics, including booking the meeting room, arranging catering, providing technical services (audiovisual equipment, translation), and printing communication materials, if any.

The service provider shall provide unit prices for all services under the order-based element in the financial annex. Expertise France will issue purchase orders for these services as needed, based on the prices provided.

### **4) Anticipated deliverables**

The table below outlines the anticipated deliverables for the Consultant. The consultant will be responsible for producing a set of deliverables align with the key tasks outlined in the Scope of Works and Assignment Description.

Please note:

- the timelines of target dates are indicative and may be adjusted depending on the consultant proposed methodology and workplan. The timeline starts after the signed or specifically mentioned on the designated contract.
- The timeline of Tasks 3 is subject to be validate and approved by the main counterpart of EBTKE Bioenergy. Consultants should be aware of the potential for delays and the need for more time and asked to provide some flexibility in terms of time at no additional cost.

Deliverables	Timeline	Percent
Task 1 (1-4): Progress report on first phase including approve workplan and methodology, and general biomass screening database on Ms. Excel basis and GIS map base on the existing theoretical potential. Kick-off meeting report.	T + 4 week	20%
Task 1 (5-6): Selected provincial study area in region of Sulawesi and progress report and PPT material of Phase 1, include provide detail data collection, information and GIS map on the annexes. The softcopy of all material including database and GIS is shared on the selected server.	T + 8 week	
Task 2 (1-3): Conduct comprehensive and specific data collection and develop detail biomass database on Ms. Excel basis and detail GIS map base on the result of Task2. The softcopy of all material including database and GIS is shared on the selected server.	T + 24 week	45%
Task 2 (4-6): Resume and conclusion base the result of comprehensive analysis on Task2 with identified priority list of biomass project location, and progress report and PPT material of Phase 2. The softcopy of all material including biomass database, biomass financial spreadsheet, and GIS will be shared on the selected server.	T + 30 week	
Task 3 (1): Prepare the final technical report base on the result of Task 1 and Task 2.	T + 32 week	35%
Task 3 (2): Develop guideline or manual book on methodology to conduct biomass resource assessment, including the use of GIS method, and biomass financial analysis.	T + 30 week	
Task 3 (3): Training the guideline on how to conduct biomass resources assessment, the use of biomass database, biomass financial analysis and GIS application to EBTKE Bioenergy team and related stakeholders. Training event report.	T + 34 week	
Task 3 (4): Dissemination to the public on the result and output of the activities. Dissemination event report.	T + 36 week	

Task 3 (5-6): Prepare and the final activity report with a two pages executive summary, and prepare two pages communication summaries	T + 40 week	
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The deliverables for the order-based element will be defined in each purchase order.

## 5) Work Coordination

Mrs. Richita FAVOR of the Sustainable Development Department will be the Technical Assistance Lead for Expertise France. E-mail: [richita.favor@expertisefrance.fr](mailto:richita.favor@expertisefrance.fr)

Mr. Bayuaji KENCANA, as the Bioenergy Strategy and Quality Supervisor (Supervisor) will act as the technical liaison between the appointed Consultants, Expertise France (EF), and EBTKE Bioenergy.

Supervisor will support Technical Assistance Lead on supervise and monitor the progress of work of consultant, and ensuring that all activities are effectively implemented, reviewed, and aligned with objective, output and specific scope of work as described on this Technical TOR.

A launch meeting shall be held 1-week maximum after the contract award has been notified.

The interaction between these parties (EF, Supervisor, Consultant, and EBTKE Bioenergy) will be structured through regular meetings, technical reviews, and reporting mechanisms to ensure efficient communication, progress tracking, and quality assurance.

The dedicated team of consultant will have responsibility to carry out the whole process and submitted deliverables as scheduled under Task 1 – 3, including manage daily communication and all coordination with EF, Supervisor, EBTKE Bioenergy, and related stakeholders.

The consultant also responsible to carry out series of meeting with related stakeholders (kick-off, data collection, meeting with EBTKE Bioenergy and related stakeholders, deep interview biomass industries (agriculture sector, plantation sector, biomass suppliers HTI/HGU, project developers/IPP, utility/PLN, local governments, etc), training and dissemination of the results, including provide minutes of meetings, activity reports on training and dissemination.

## V. Place, duration and terms of performance

Duration of the contract: 10 (ten) months

Beginning of the contract: October 2025

Contract Type: public contract for services at fixed and total prices

Location: Jakarta and Sulawesi region.

## VI. Required expertise and profile

The Consulting firm will carry out the scope of work on the proposed Tasks and provide the following specialists. The estimated level of efforts (person-months or can be number of days) on table below is as references and Consultant could propose a competitive bid.

Specialist/Expert	Person-months
Sustainable Biomass Project Specialist/Lead (National)	6
GIS Specialist (National)	4
Project Manager of Data Collection and Analysis (National)	6
Project Manager on Reporting and Guideline, and Events (National)	6
Total	22

The term of references and qualification for the consultant firm and individual specialists are as follow:

The assignment requires a consultant firm with proven experiences on biomass project development including conducting biomass feedstock site survey, developing the biomass project feasibility study, implementing complex series of activities, engagement with regulators, private sectors, small-medium companies or cooperatives, and local farmers. Experiences on developing specific guideline on renewable energy and developing GIS mapping. The firm must demonstrate both technical proficiency and contextual understanding relevant to the international standard practices and Indonesian regulatory and institutional environment, specifically on sustainable biomass project development.

### 1) Qualification of Consulting Firm

- The consultant firm must be a legally registered entity with a minimum of 5 years of operational experience in the field of bioenergy, technical capacity on design and engineering, field survey, sustainability consulting, and public sector advisory.
- Demonstrated experience working with Indonesian government agencies, international development organizations or public institutions, global and local network on renewable energy industry especially on sustainable biomass project development is a plus.
- Strong project management capacity and operation financial capacity, and ability to deliver high-quality outputs within agreed timelines.
- Availability of a dedicated team of qualified specialist/expert and manager level with strong backgrounds in renewable energy-biomass development (national/Indonesian context), and sustainable biomass project development.
- Available to provide dedicated team that excellent spoken and written English and Bahasa is required.

### 2) Qualification of Sustainable Biomass Project Specialist/Lead (National)

#### Professional Experience

- At least 10 years of professional experience in renewable energy especially on sustainable biomass project development within public or private organizations.
- Minimum of 5 years of direct experience in the bioenergy sector, specifically on biomass power plant project, biomass project feasibility study, and biomass resources assessment. Experiences in developing bioenergy/biomass mapping and database is a strong advantage.
- Experience on developing renewable energy guideline standard base on international base practice, conducting training and dissemination. Experiences in the developing specific bioenergy/biomass resources guideline base on international best practice and standard is a strong advantage.

#### **Education, Knowledge, and Skill**

- Advanced degree (Master's or Ph.D.) in Engineering, Environmental Science, or a related field. Education in the field of energy or specifically in bioenergy would be a strong asset.
- Strong knowledge of international biomass market, country specific biomass project development plan/roadmap, project business scheme, incentives, set of biomass tariff, and fuel supply agreement.
- Specific knowledge on conducting sustainable biomass feedstock feasibility studies, including conduct field survey, engage with biomass industry, deep understanding on biomass type and characteristic, biomass collection related to socio-economic benefits, and biomass sustainable criteria. Familiarity with biomass sustainable certifications, and appraisal of bioenergy and food security is a strong advantage.
- Specific knowledge on successful long-term operation of on-grid biomass power plant projects based on agriculture residues and based on dedicated energy plantation. Project familiarity in European and Asian countries is a strong advantage.
- Capability and experiences on leading a team work on specific mission, studies, and field survey, and good communication and management skills and prepare and implement the workplan align with propose timeline.
- Ability to provide training on the specific topic on biomass resources assessment.
- Ability to produce clear, detail and concise reports including all minutes of meetings, documentations, field activity report, training report, progress report, and final report.
- Ability to produce clear, concise, and actionable reports in English for both technical and non-technical audiences.

### **3) Qualification of GIS Specialist (National)**

#### **Professional Experience**

- At least 10 years of professional experience in GIS development within public or private organizations.
- Experience on working on related work of mapping renewable energy data collection, manage, compile and structured of complex data, engage with related stakeholders include capability to collect secondary and primary data. Work experienced on development of GIS mapping on biomass potential would be a plus value.

- Experience as a trainer on GIS application, stakeholder engagement, including deep interviews, workshops, dissemination forum, or consultations with government, private sector, and civil society actors.

**Education, Knowledge, and Skill**

- Bachelor degree (BSc) in Geography, Engineering, Environmental, or a related field. Writing and published research or work on GIS mapping on renewable energy would be a strong asset.
- Deep knowledge and skill on working with GIS tool, device and map, use of satellite image, and develop biomass GIS mapping with layering to other land use and infrastructure.
- Strong knowledge of agriculture, plantation, agro-processing mills, dedicated energy plantation concept, variety and characteristic of biomass in Indonesia.
- Ability to travel and take long trip to carry out field survey in remote area with complex tasks to collect and verify complex data and information.
- Ability to work and prepare on the development of biomass resources assessment especially on the manual-use and GIS application, including supporting project Lead on the analysis of biomass project.
- Ability to provide training on the specific topic on the use of GIS application for biomass resources assessment.
- Ability to produce clear, concise, and actionable reports in English for both technical and non-technical audiences.

**4) Qualification of Project Manager 1: Data Collection, Analysis and Coordination (National)****Professional Experience**

- At least 5 years of professional experience in renewable energy especially on sustainable biomass project development within public or private organizations.
- Experience on related work on renewable energy and or biomass data collection, manage, compile and structure of complex data, engage with related stakeholders include capability to collect primary data on the field.
- Experience in stakeholder engagement, including deep interviews, workshops, dissemination forum, or consultations with government, private sector, and civil society actors.

**Education, Knowledge, and Skill**

- Bachelor degree (BSc) in Engineering, Environmental Science, or a related field. Writing and published research on the topic of renewable energy would be a strong asset.
- Strong knowledge of agriculture, plantation, agro-processing mills, variety and characteristic of biomass in Indonesia.
- Knowledge on working with GIS tool, device and map, use of satellite image.
- Ability to travel and take long trip to carry out field survey in remote area with complex tasks to collect and verify complex data and information.



- Capability on developing and manage complex data and information into database base on Ms. Excel program including supporting project Lead on the analysis of biomass project.
- Ability to produce clear, concise, and actionable reports for both technical and non-technical audiences.

## **5) Qualification of Project Manager 2: Reporting, Guideline and Event Organizer (National)**

### **Professional Experience**

- At least 5 years of professional experience in renewable energy especially on sustainable project development within public or private organizations.
- Experience on related work on renewable energy and or biomass project development, manage, compile and structure of complex report, engage with related stakeholders include capability to writing standard official report, and support on prepare guideline or manual book.
- Experience in organize events of training, stakeholder engagement, including deep interviews, workshops, dissemination forum, or consultations with government, private sector, and civil society actors.

### **Education, Knowledge, and Skill**

- Bachelor degree (BSc) in Engineering, Environmental Science, or a related field. Writing and published research or developing a guideline book on the topic of renewable energy would be a strong asset.
- Knowledge of agriculture, plantation, agro-processing mills, dedicated energy plantation concept, variety and characteristic of biomass in Indonesia.
- Knowledge on working with GIS tool, device and map, use of satellite image, and database base on Ms. Excel program.
- Ability to produce clear, detail and concise reports including all minutes of meetings, documentations, field activity report, training report, progress report, and final report.
- Ability to produce clear, concise, and actionable reports in English for both technical and non-technical audiences.

## **VII. Monitoring-evaluation**

The monitoring and evaluation (M&E) of this consultancy will be based on the timely delivery and quality of outputs, as well as their contribution to provide deliverables within EBTKE Bioenergy. The consultant's performance will be assessed through a combination of deliverable-based verification, progress tracking, and feedback from Expertise France and EBTKE Bioenergy.

The table below outlines the key deliverables, verification, validation of the work.

Deliverables	Verification	Validation
Workplan, methodology, and deliverables.	Presented on kick-off meeting with EBTKE Bioenergy	Acceptance from EF and EBTKE Bioenergy
<p>Task 1 (1-4): Develop general biomass database on Ms. Excel basis and GIS map. Kick-off meeting report.</p> <p>Task 1 (5): Selected provincial study area in each region of Sulawesi for detail biomass resources assessment based on rank of the list of all provincials on each region base on the defined criteria.</p>	Biomass general database, GIS map and selected provincial area submitted and obtained inputs and comments from EF and EBTKE Bioenergy.	Acceptance from EF and EBTKE Bioenergy
Task 1 (6): Progress report and PPT material of Phase 1, include provide detail data collection, information and GIS map on the annexes. The softcopy off all material including database and GIS will be shared on the selected server.	Progress report, PPT material, and softcopy off all material submitted, including shared database and GIS on the selected server, and obtained inputs and comments from EF.	Acceptance from EF
<p>Task 2 (1-3): Develop detail biomass database on Ms. Excel basis and detail GIS map base on the result of Task2.</p> <p>Task 2 (4-5): Resume and conclusion base the result of comprehensive analysis on Task2 with identified priority list of biomass project location.</p>	Biomass detail database, GIS map, and conclusion base the result of comprehensive analysis and priority list submitted, and obtained inputs and comments from EF.	Acceptance from EF
Task 2 (6): Progress report and PPT material of Phase 2, include provide detail data collection, information and GIS map on the annexes. The softcopy off all material including database and GIS will be shared on the selected server.	Progress report, PPT material, and softcopy off all material submitted, including shared database and GIS on the selected server, and obtained inputs and comments from EF.	Acceptance from EF
Task 3 (1): Prepare the final technical report base on the result of Task 1 and Task 2.	Final report, PPT material submitted and obtained inputs and comments from EF and EBTKE Bioenergy.	Acceptance from EF and EBTKE Bioenergy

Deliverables	Verification	Validation
Task 3 (2): Develop guideline book on biomass resource assessment, including the use of GIS methods	Draft guideline book and ppt material submitted and obtained inputs and comments from EF.	Acceptance from EF
Task 3 (3): Training the guideline on how to conduct biomass resources assessment, the use of biomass database and GIS map to EBTKE Bioenergy team and related stakeholders. Training event report.	Training activity had been held and submitted the training activity report	Acceptance from EF
Task 3 (4): Dissemination to the public on the result and output of the activities. Training event report.	The dissemination forum had been held and submitted activity reports.	Acceptance from EF and EBTKE Bioenergy
Task 3 (5-6): Prepare and the final activity report. The activity report consists of all activity report during Task 1 and Task 3 which are not cover on the technical report, including all minutes of meetings, documentations, field activity report, training report, etc.	Draft final activity report submitted, presented and obtained inputs and comments from EF and EBTKE Bioenergy.	Acceptance from EF and EBTKE Bioenergy