



REQUEST FOR PROPOSAL (RFP)

To: All Interested Bidders	DATE: January 31, 2022
	REFERENCE: RFP/UNDP/SMILE/162570/003/2022 – Waste Management Information System (WMIS) for Medical Waste Logistics in Indonesia

Dear Sir / Madam:

The United Nations Development Programme (UNDP) hereby invites you to submit a Proposal to this Request for Proposal with reference **RFP/UNDP/SMILE/162570/003/2022 – Waste Management Information System (WMIS) for Medical Waste Logistics in Indonesia**.

A **bidder's conference** will be held on:

Date/Time : Monday, 7 February 2022

Place : Zoom Online Meeting

Meeting ID :

<https://undp.zoom.us/j/82338365677?pwd=MUVjZzNvaGxFeHhPWVFaQnBVWkM3dz09> – (823 3836 5677)

Password : 372473

Detailed Terms of Reference (TOR) as well as other requirements are listed in the RFP available on UNDP ATLAS e-Tendering system (<https://etendering.partneragencies.org>) **Event ID: 0000011470**

Your offer, comprising of a Technical and Financial Proposal, should be submitted in accordance with the RFP requirements, through the UNDP ATLAS e-Tendering system and by the deadline indicated in <https://etendering.partneragencies.org>.

NOTE! The Financial Proposal and the Technical Proposal files **MUST BE COMPLETELY SEPARATE** and uploaded separately in the system and clearly named as either “TECHNICAL PROPOSAL” or “FINANCIAL PROPOSAL”, as appropriate. Each document shall include the Proposer’s name and address. The file with the “FINANCIAL PROPOSAL” must be encrypted with a password so that it cannot be opened nor viewed until the Proposal has been found to pass the technical evaluation stage. Once a Proposal has been found to be responsive by passing the technical evaluation stage, UNDP shall request the Proposer to submit the password to open the Financial Proposal.

The Proposer shall assume the responsibility for not encrypting the financial proposal. **NOTE: DO NOT ENTER PROPOSAL PRICE IN THE SYSTEM, INSTEAD ENTER ONE (1). Failed to meet this requirement, proposal will be rejected.**

In the course of preparing and submitting your Proposal, it shall remain your responsibility to ensure that it is submitted into the system by the deadline. The system will automatically block and not accept any bid after the deadline. In case of any discrepancies deadline indicated in the system shall prevail.

Kindly ensure that supporting documents required are signed and stamped and in the .pdf format, and free from any virus or corrupted files and **FINANCIAL PROPOSAL IS PASSWORD PROTECTED. NOTE! The File name should contain only Latin characters (No Cyrillic or other alphabets). Failed to meet this requirement, proposal will be rejected.**

You are kindly requested to indicate whether your company intends to submit a Proposal by clicking on “**Accept Invitation**” button no later than **07 January 2022**. If that is not the case, UNDP would appreciate your indicating the reason, for our records.

If you have not registered in the system before, you can register now by logging in using:

username: event.guest

password: why2change

The step by step instructions for registration of bidders and quotation submission through the UNDP ATLAS e-Tendering system is available in the “Instructions Manual for the Bidders”, attached. Should you require any training on the UNDP ATLAS e-Tendering system or face with any difficulties when registering your company or submitting your quotation, please send an email to armada.pratama@undp.org cc: yusef.millah@undp.org.

Please note that ATLAS has following minimum requirements for password:

1. Minimum length of 8 characters
2. At least one capital letter.
3. At least one number.

New bidder registering for first time, system will not accept any password that does not meet the above requirements and thus registration cannot be completed.

For already existing bidders whose current password does not meet the criteria, when signing in, system will prompt you to change the password, and it will not accept a new password that does not meet requirement.

The user guide and videos are made available to bidder in the UNDP public website in this link:

<https://www.undp.org/content/undp/en/home/procurement/business/resources-for-bidders.html>The bidders are advised to use Internet Explorer (Version 10 or above) to avoid any compatibility issues with the e-tendering system.

No hard copy or email submissions will be accepted by UNDP.

UNDP looks forward to receiving your Proposal and thanks you in advance for your interest in UNDP procurement opportunities.

Sincerely yours,

DocuSigned by:



21B257514E5748B
Martin Stephanus Kurnia

Head of Procurement Unit

1/31/2022

Annex 1

DESCRIPTION OF REQUIREMENTS

Context of the Requirement	<p>As the fourth most populous country in the world with a total population of around 250 million people, Indonesia has paid significant attention to the construction of health care facilities in 34 provinces. Based on the recent information from the Ministry of Health in 2020, there are 12,893 units of health care facilities throughout Indonesia, consisting of 2,900 units of hospitals and 9,993 units of health community centers has been operating. In fact, the number of health care facilities will continue to increase to meet the needs of the community, particularly on the eastern part of Indonesia and remote area as well. So, there is no doubt that the medical waste generated will also increase, even posing more dangerous to the public health and the environment. This situation requires a better and sustainable medical waste management to reduce public health risks and occupational hazards among health care workers.</p> <p>One of the priorities of the Indonesian government as outlined in Law number 32/2009 concerning Environmental Protection and Management states that the management of hazardous waste, including medical waste is the responsibility of the waste generator (in this case are health care facilities) in order to preserve the environment and protect public health.</p>																			
Implementing Partner of UNDP	Ministry of Health (MoH) & Ministry of Environment & Forestry (MoEF)																			
Brief Description of the Required Services¹	<p>UNDP Indonesia is looking for a selected IT Business Company to provide services as follows:</p> <ol style="list-style-type: none"> 1. Develop Mobile and web application, and digital scale or smart devices (IOT) for medical Waste Management Information System (WMIS) in Indonesia, started with 2 targeted provinces (Jakarta & Jogjakarta) as pilot projects with electronic medical waste monitoring devices. 2. Provides Training in operation, system administration, application software, troubleshooting and hardware maintenance following at user site to UNDP and MoH including development of the training modules (audio-visual and manual guide) 																			
List and Description of Expected Outputs to be Delivered	<table border="1"> <thead> <tr> <th data-bbox="491 1182 555 1238">No.</th> <th data-bbox="561 1182 1023 1238">Deliverables for Core Functions (Main Contract)</th> <th data-bbox="1029 1182 1225 1238">Payment Schedule (%)</th> <th data-bbox="1232 1182 1383 1238">Est. Due Dates</th> </tr> </thead> <tbody> <tr> <td data-bbox="491 1247 555 1538">1</td> <td data-bbox="561 1247 1023 1538"> Design Report on: <ul style="list-style-type: none"> • Conceptual Design for Software (offering proposal consist of details and goals of the project). • Technical Design Online Document (e.g., Functional Specification, ER Diagram, Test Plan). • Prototype (Design Mock-up) of System in IOT, mobile, web application, and core modules. </td> <td data-bbox="1029 1247 1225 1538">20 %</td> <td data-bbox="1232 1247 1383 1538">February, 2022</td> </tr> <tr> <td data-bbox="491 1547 555 1832">2</td> <td data-bbox="561 1547 1023 1832"> Passing User Acceptance Test (UAT), System Integration Test (SIT), Digital Scale & QR Printer Installation and Online Guidelines (Technical Guide & User Guide) Implemented & working software with: <ul style="list-style-type: none"> • Piloting and testing app phase 1 (for all waste tracking and monitoring features). • Go live implementation (for the rest of the features) in MoH server. </td> <td data-bbox="1029 1547 1225 1832">40 %</td> <td data-bbox="1232 1547 1383 1832">April, 2022</td> </tr> <tr> <td data-bbox="491 1841 555 1883">3</td> <td data-bbox="561 1841 1023 1883">Training for Focal Points and User at targeted provinces for the pilot projects</td> <td data-bbox="1029 1841 1225 1883">30 %</td> <td data-bbox="1232 1841 1383 1883">May, 2022</td> </tr> </tbody> </table>	No.	Deliverables for Core Functions (Main Contract)	Payment Schedule (%)	Est. Due Dates	1	Design Report on: <ul style="list-style-type: none"> • Conceptual Design for Software (offering proposal consist of details and goals of the project). • Technical Design Online Document (e.g., Functional Specification, ER Diagram, Test Plan). • Prototype (Design Mock-up) of System in IOT, mobile, web application, and core modules. 	20 %	February, 2022	2	Passing User Acceptance Test (UAT), System Integration Test (SIT), Digital Scale & QR Printer Installation and Online Guidelines (Technical Guide & User Guide) Implemented & working software with: <ul style="list-style-type: none"> • Piloting and testing app phase 1 (for all waste tracking and monitoring features). • Go live implementation (for the rest of the features) in MoH server. 	40 %	April, 2022	3	Training for Focal Points and User at targeted provinces for the pilot projects	30 %	May, 2022			
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¹ A detailed TOR may be attached if the information listed in this Annex is not sufficient to fully describe the nature of the work and other details of the requirements.

	<p>Final Report (BAST Document) Implemented & handover working software with:</p> <ul style="list-style-type: none"> • Credentials for Email and Cloud Console access for Setup Server as Super Admin level • Source Code, Database & Related Contents 														
	<p>4 Software Maintenance for 8 months which includes:</p> <ul style="list-style-type: none"> • Expert level guidance and troubleshooting in connection with questions and issues arising from the installation and use of the software • Online support for troubleshooting or guidance • On-site support for troubleshooting or guidance if required (max. 4 days per month in Jakarta Area) • Bug fixes and issue resolution with ticketing system 	10%	December, 2022												
	Total	100 %													
Person to Supervise the Work/Performance of the Service Provider	Technical Officer Medical Waste Management;														
Frequency of Reporting	Please refer to the TOR														
Progress Reporting Requirements	Please refer to the TOR														
Location of work	<input type="checkbox"/> Exact Address/es <input checked="" type="checkbox"/> At Contractor's Location, if required, for technical works specifically indicated in the proposal														
Expected duration of work	10 Months (Phase 1)														
Target start date	February 28, 2022														
Latest completion date															
Travels Expected	<table border="1"> <thead> <tr> <th>Destination/s</th> <th>Estimated Duration</th> <th>Brief Description of Purpose of the Travel</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Jakarta</td> <td>4 days</td> <td>Installation and Training</td> <td>2</td> </tr> <tr> <td>Yogyakarta</td> <td>4 days</td> <td>Installation and Training</td> <td>2</td> </tr> </tbody> </table>			Destination/s	Estimated Duration	Brief Description of Purpose of the Travel	Frequency	Jakarta	4 days	Installation and Training	2	Yogyakarta	4 days	Installation and Training	2
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Jakarta	4 days	Installation and Training	2												
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Special Security Requirements	<input checked="" type="checkbox"/> Security Clearance from UN prior to travelling <input type="checkbox"/> Completion of UN's Basic and Advanced Security Training <input type="checkbox"/> Comprehensive Travel Insurance <input type="checkbox"/> Others [pls. specify]														
Facilities to be Provided by UNDP (i.e., must be excluded from Price Proposal)	N/A														
Implementation Schedule indicating breakdown and timing of activities/sub-activities	<input checked="" type="checkbox"/> Required														
Names and curriculum vitae of individuals who	<input checked="" type="checkbox"/> Required														

will be involved in completing the services																					
Currency of Proposal	<input checked="" type="checkbox"/> United States Dollars or <input checked="" type="checkbox"/> Local Currency for Local Bidders																				
Value Added Tax on Price Proposal ²	<input checked="" type="checkbox"/> must be exclusive of VAT and other applicable indirect taxes																				
Validity Period of Proposals (<i>Counting for the last day of submission of quotes</i>)	<input checked="" type="checkbox"/> 90 days In exceptional circumstances, UNDP may request the Proposer to extend the validity of the Proposal beyond what has been initially indicated in this RFP. The Proposal shall then confirm the extension in writing, without any modification whatsoever on the Proposal.																				
Partial Quotes	<input checked="" type="checkbox"/> Not permitted																				
Payment Terms³	Payment will be made based on deliverables and after satisfactory acceptance by UNDP the services provided on the following schedule:																				
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² VAT exemption status varies from one country to another. Pls. check whatever is applicable to the UNDP CO/BU requiring the service.

³ UNDP preference is not to pay any amount in advance upon signing of contract. If the Service Provider strictly requires payment in advance, it will be limited only up to 20% of the total price quoted. For any higher percentage, or any amount advanced exceeding \$30,000, UNDP shall require the Service Provider to submit a bank guarantee or bank cheque payable to UNDP, in the same amount as the payment advanced by UNDP to the Service Provider.

	<ul style="list-style-type: none"> • Online support for troubleshooting or guidance • On-site support for troubleshooting or guidance if required (max. 4 days per month in Jakarta Area) • Bug fixes and issue resolution with ticketing system 		
	Total	100 %	
Person(s) to review/inspect/approve outputs/completed services and authorize the disbursement of payment	Technical Officer Medical Waste Management;		
Type of Contract to be Signed	<input checked="" type="checkbox"/> Professional Service Contract		
Criteria for Contract Award	<input type="checkbox"/> Lowest Price Quote among technically responsive offers <input checked="" type="checkbox"/> Highest Combined Score (based on the 70% technical offer and 30% price weight distribution) <input checked="" type="checkbox"/> Full acceptance of the UNDP Contract General Terms and Conditions (GTC). This is a mandatory criterion and cannot be deleted regardless of the nature of services required. Non-acceptance of the GTC may be grounds for the rejection of the Proposal.		
Criteria for the Assessment of Proposal	<p><u>Technical Proposal (70%)</u></p> <input checked="" type="checkbox"/> Expertise of the Firm 20% <input checked="" type="checkbox"/> Methodology, Its Appropriateness to the Condition and Timeliness of the Implementation Plan 30% <input checked="" type="checkbox"/> Management Structure and Qualification of Key Personnel 30% <input checked="" type="checkbox"/> Presentation, Bidder approach for Methodology, Technical Approach, and Implementation Plan 20% <p><i>NOTE: Only bidder(s) who received minimum 56 points (70% out of 80) will be requested to provide presentation and only bidder(s) who received minimum of 70 points (70% out of max. 100) will be requested to provide the password to open the financial proposal</i></p> <p><u>Financial Proposal (30%)</u></p> To be computed as a ratio of the Proposal's offer to the lowest price among the proposals received by UNDP.		
UNDP will award the contract to:	<input checked="" type="checkbox"/> One and only one Service Provider <input type="checkbox"/> One or more Service Providers, depending on the following factors:		
Contract General Terms and Conditions ⁴	<input type="checkbox"/> General Terms and Conditions for contracts (goods and/or services) <input checked="" type="checkbox"/> General Terms and Conditions for de minimis contracts (services only, less than \$50,000) Applicable Terms and Conditions are available at: http://www.undp.org/content/undp/en/home/procurement/business/how-we-buy.html		
Annexes to this RFP ⁵	<input checked="" type="checkbox"/> Form for Submission of Proposal (Annex 2) <input checked="" type="checkbox"/> Detailed TOR (Annex 3) <input checked="" type="checkbox"/> Others ⁶ - 1. Written self declaration of impartiality (Annex 4)		

⁴ Service Providers are alerted that non-acceptance of the terms of the General Terms and Conditions (GTC) may be grounds for disqualification from this procurement process.

⁵ Where the information is available in the web, a URL for the information may simply be provided.

⁶ A more detailed Terms of Reference in addition to the contents of this RFP may be attached hereto.

	2. Special condition (Annex 5)
Contact Person for Inquiries (Written inquiries only) ⁷	<i>Armada Eras Pratama and Yusef Saiful Millah</i> <i>Procurement Unit</i> armada.pratama@undp.org and yusef.millah@undp.org Any delay in UNDP's response shall be not used as a reason for extending the deadline for submission, unless UNDP determines that such an extension is necessary and communicates a new deadline to the Proposers.
Other Information [pls. specify]	Format: PDF files only File names must be maximum 60 characters long and must not contain any letter or special character other than from Latin alphabet/keyboard. All files must be free of viruses and not corrupted. Max. File Size per transmission: N/A

⁷ This contact person and address is officially designated by UNDP. If inquiries are sent to other person/s or address/es, even if they are UNDP staff, UNDP shall have no obligation to respond nor can UNDP confirm that the query was received.

Annex 2

FORM FOR SUBMITTING SERVICE PROVIDER'S PROPOSAL⁸

(This Form must be submitted only using the Service Provider's Official Letterhead/Stationery⁹)

[insert: Location].

[insert: Date]

To: [insert: Name and Address of UNDP focal point]

Dear Sir/Madam:

We, the undersigned, hereby offer to render the following services to UNDP in conformity with the requirements defined in the RFP dated [specify date], and all of its attachments, as well as the provisions of the UNDP General Contract Terms and Conditions :

A. Qualifications of the Service Provider

The Service Provider must describe and explain how and why they are the best entity that can deliver the requirements of UNDP by indicating the following :

- a) Profile – describing the nature of business, field of expertise, licenses, certifications, accreditations;*
- b) Business Licenses – Registration Papers or legal basis of organization establishment .*
- c) Latest Audited Financial Statement – income statement and balance sheet to indicate Its financial stability, liquidity, credit standing, and market reputation;*
- d) Track Record – list of clients for similar services as those required by UNDP, indicating description of contract scope, contract duration, contract value, contact references by providing list of names, phone number and email address;*
- e) Written Self-Declaration that the company is not in the UN Security Council 1267/1989 List, UN Procurement Division List or Other UN Ineligibility List.*

B. Proposed Methodology for the Completion of Services

The Service Provider must describe how it will address/deliver the demands of the RFP; providing a detailed description of the essential performance characteristics, reporting conditions and quality assurance mechanisms that will be put in place, while demonstrating that the proposed methodology will be appropriate to the local conditions and context of the work.

⁸ This serves as a guide to the Service Provider in preparing the Proposal.

⁹ Official Letterhead/Stationery must indicate contact details – addresses, email, phone and fax numbers – for verification purposes

C. Qualifications of Key Personnel

If required by the RFP, the Service Provider must provide:

- a) Names and qualifications of the key personnel that will perform the services indicating who is Team Leader, who are supporting, etc.;*
- b) CVs demonstrating qualifications must be submitted if required by the RFP; and*
- c) Written confirmation from each personnel that they are available for the entire duration of the contract.*

D. Cost Breakdown per Deliverable*

No	Deliverables [list them as referred to in the RFP]	Percentage of Total Price (Weight for payment)	Price (Lump Sum, All Inclusive)
1	Design Report on: <ul style="list-style-type: none"> • Conceptual Design for Software (offering proposal consist of details and goals of the project). • Technical Design Online Document (e.g., Functional Specification, ER Diagram, Test Plan). • Prototype (Design Mock-up) of System in IOT, mobile, web application, and core modules. 	20 %	
2	Passing User Acceptance Test (UAT), System Integration Test (SIT), Digital Scale & QR Printer Installation and Online Guidelines (Technical Guide & User Guide) Implemented & working software with: <ul style="list-style-type: none"> • Piloting and testing app phase 1 (for all waste tracking and monitoring features). • Go live implementation (for the rest of the features) in MoH server. 	40 %	
3	Training for Focal Points and User at targeted provinces for the pilot projects Final Report (BAST Document) Implemented & handover working software with: <ul style="list-style-type: none"> • Credentials for Email and Cloud Console access for Setup Server as Super Admin level • Source Code, Database & Related Contents 	30 %	
4	Software Maintenance for 8 months which includes: <ul style="list-style-type: none"> • Expert level guidance and troubleshooting in connection with questions and issues arising from the installation and use of the software • Online support for troubleshooting or guidance • On-site support for troubleshooting or guidance if required (max. 4 days per month in Jakarta Area) • Bug fixes and issue resolution with ticketing system 	10%	
	Total	100%	

**This shall be the basis of the payment tranches*

E. Development Phase 1 Cost Breakdown by Cost Component [This is only an Example]:

Personnel / Other Elements	Qty	UOM	Qty	UOM	Unit Price	Total Price
Personnel						
Project Manager	1	Person	3	Month		
Business Analyst/System Analyst	1	Person	3	Month		
Full Stack Developer	2	Person	3	Month		
Mobile Application Developer	2	Person	3	Month		
UI/UX Designer	1	Person	3	Month		
SQA	1	Person	3	Month		
Developer Operations	1	Person	3	Month		
Technical Writer	1	Person	3	Month		
Goods & Services						
4" QR Code Thermal Printer, Industrial Grade, Wi-Fi capabilities & Sticker (10.000 4" Labels) Warranty on Parts and Labor for minimum period of 1 year (DKI Jakarta & Yogyakarta @ 1 device)	1	Device	2	Location		
Digital Scale (Min 150 Kgs), Industrial Grade, Wi-Fi capabilities & connect to Printer Warranty on Parts and Labor for minimum period of 1 year (DKI Jakarta & Yogyakarta @ 1 device)	1	Device	2	Location		
Other expenses						
Maintenance & Support • Incl. technical support for preventive and corrective maintenance	1	Lump	8	Months		
Other (if any, please provide in detail)						
Total						

F. Optional Development Phase 2 (30 Site in 5 Provinces) (Will not include in the Contract)

Optional for Development Phase 2 with Scope of Work refer to the TOR. The implementation of phase 2 subject to budget availability and vendor performance.

G. Optional Development Phase 3 (80 Site in 9 Provinces) Component (Will not include in the Contract)

Optional for Development Phase 3 with Scope of Work refer to the TOR. The implementation of phase 3 subject to budget availability and vendor performance.

H. Optional Cost Breakdown for Additional Month Cost Component (Will not include in the Contract but will be use if there any additional requirement)

[This is only an Example]:

Personnel / other elements	Qty	UOM	Qty	UOM	Unit Price	Total Price
Personnel						
Project Manager	1	Person	1	Month		
Business Analyst/System Analyst	1	Person	1	Month		
Full Stack Developer	1	Person	1	Month		
Mobile Application Developer	1	Person	1	Month		
UI/UX Designer	1	Person	1	Month		
SQA	1	Person	1	Month		
IoT Developer	1	Person	1	Month		
Developer Operations	1	Person	1	Month		
Technical Writer	1	Person	1	Month		
Onsite Technical Support for each Fanyankes	1	Person	1	Month		
Goods & Services						
4" QR Code Thermal Printer, Industrial Grade, Wi-Fi capabilities & Sticker (10.000 4" Labels) Warranty on Parts and Labor for minimum period of 1 year	1	Device	1	Location		
Digital Scale (Min 150 Kgs), Industrial Grade, Wi-Fi capabilities & connect to Printer Warranty on Parts and Labor for minimum period of 1 year	1	Device	1	Location		
GPS Track, with specs: <ul style="list-style-type: none"> An integrated electronic GPS track that are combined with GSM communication to locate the vehicle with real-time alert The device is automatically added to the system as part of back-end service Rechargeable battery / at least 1 years useful life / min. 10 hours power back up The battery status indicator on the display provides information on the remaining battery charge. Provides technical support on SDK, API or any form, in order to get data into the software. Provides Maps with Real-time Tracking and Geofencing features Including GSM data (GPRS) subscription for 12 months Warranty on Parts and Labor for minimum period of 1 year 	1	Device	1	Location		

<ul style="list-style-type: none"> Provision of replacement Service Unit when pulled out for maintenance/ repair 						
Other expenses						
Maintenance & Support 2nd Year <ul style="list-style-type: none"> Incl. technical support for preventive and corrective maintenance 	1	Lump	1	Year		
Maintenance & Support 3rd Year <ul style="list-style-type: none"> Incl. technical support for preventive and corrective maintenance 	1	Lump	1	Year		
Other (if any, please provide in detail)						
Total						

NOTE: Interested bidders are also required to submit CVs for the remaining personnel that are not stated in phase 1 but required in table H.

*[Name and Signature of the Service Provider's
 Authorized Person]*
[Designation]
[Date]

TERM OF REFERENCE

Waste Management Information System (WMIS) for Medical Waste Logistics in Indonesia

1 Background

As the fourth most populous country in the world with a total population of around 250 million people, Indonesia has paid significant attention to the construction of health care facilities in 34 provinces. Based on the recent information from the Ministry of Health in 2020, there are 12,893 units of health care facilities throughout Indonesia, consisting of 2,900 units of hospitals and 9,993 units of health community centers has been operating. In fact, the number of health care facilities will continue to increase to meet the needs of the community, particularly on the eastern part of Indonesia and remote area as well. So, there is no doubt that the medical waste generated will also increase, even posing more dangerous to the public health and the environment. This situation requires a better and sustainable medical waste management to reduce public health risks and occupational hazards among health care workers.

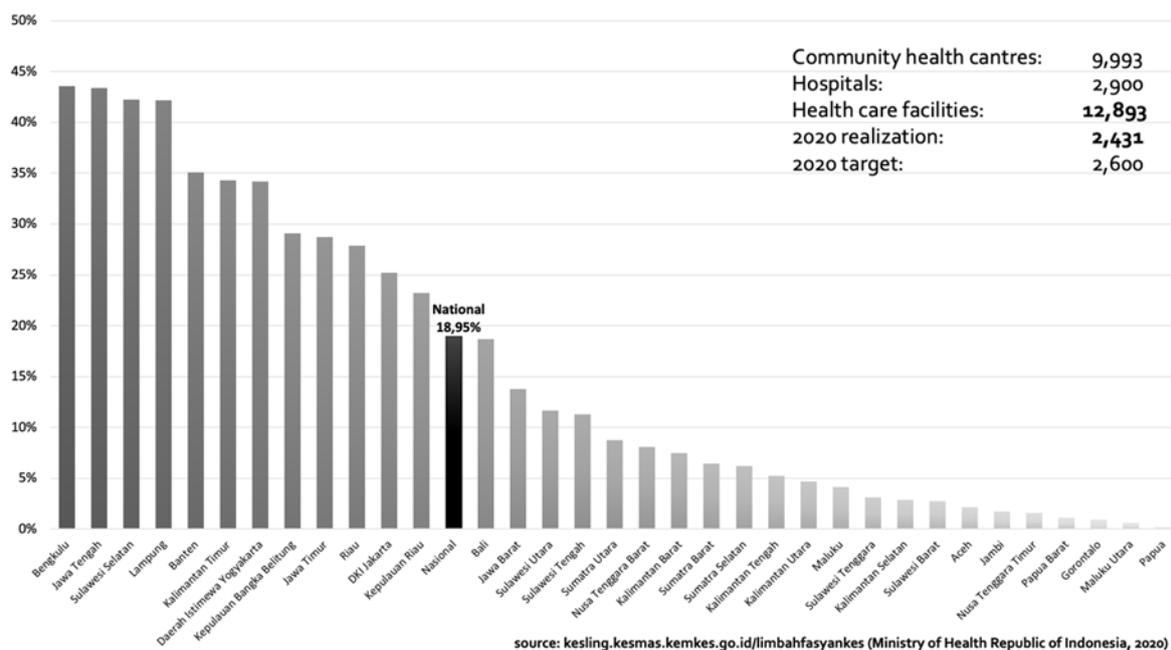


Figure 1. Information on Health Facilities that Carry Out Waste Management in Indonesia, 2021

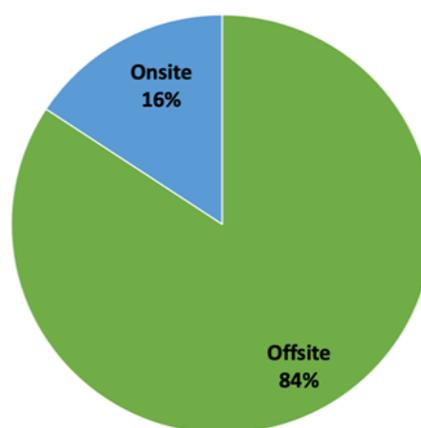
One of the priorities of the Indonesian government as outlined in Law number 32/2009 concerning Environmental Protection and Management states that the management of hazardous waste, including medical waste is the responsibility of the waste generator (in this case are health care facilities) in order to preserve the environment and protect public health. Furthermore, based on the Minister of Health Regulation number 18/2020 concerning the Regional-Based Medical Waste Management from Health Care Facilities, also states that recording and reporting of Medical Waste must be carried out by each health care facility. The National Mid-Term Development Plan (RPJMN) 2020-2025 also highlight the development of medical waste management and the control of hazardous waste as the government's top priority.

Currently, health care facilities is facing several challenges in the medical waste recording, monitoring, and reporting, such as manual recording mechanism and the absence of an integrated and automatic reporting system that can be accessed in real-time.

In addition, the recording of medical waste is still overshadowed by problems of inaccuracy, invalidity, and lack of timely report. Furthermore, data collection and information generation of medical waste transportation from health care facility to waste treatment center is as problematic as the medical waste management in each hospital or health community centers, which is not accurately tracked in the field. The urgent need to improve waste management demonstrates the need to build competencies and capacities of the environmental health workers in health care facilities, the need to develop monitoring and reporting management, as well as the need to improve supervision from each health agency officers.

There are many examples that can be noticed about medical waste management in each region, and one example is regarding the transportation of third parties with poor implementation of hazardous waste management operational standard. Medical waste management is facing a problematic challenge with a concern on safety protocols and waste management qualification for the field officers. In addition, the transportation process to the waste management site is difficult to trace with an unknown amount of medical waste generated. In its implementation, it is clearly that most of health care facilities need an integrated information system for medical waste management.

Medical waste management is a huge concern for every stakeholder during the Covid-19 pandemic, particularly for the Ministry of Health on the number of medical wastes generated at selected Covid-19 referral hospitals. Based on the information from the Ministry of Health, at least 0.98 kg/patient of medical waste are generated every day (average data from 713 health care facilities). There are 134,042 Covid-19 active case on March 17, 2020 (excerpted from covid-19.go.id), by multiplying this 0.98 kg/patient medical waste generation with 134,042 Covid-19 active case thus medical waste generation is at least 131 tons per day nationally and 84% of this medical waste is treated offsite by transporting them to treatment center facilities. This condition makes us aware on how importance the monitoring, recording, and reporting of medical waste if the waste is not managed properly.



suorce: link.kemkes.go.id/formulirimbahcovid, 2021

Figure 2. Information on Covid-19 Waste Treatment in Indonesia, 2021

From above description, it can be concluded that medical waste management in Indonesia can be identified as several points, including:

- Need to improve medical waste management, particularly during the Covid-19 pandemic in each health care facility, responsive to the lack of integration on recording, monitoring, and reporting of medical waste.
- Need to expand the number waste treatment facilities that is evenly distributed in each area and in every health care facility.
- Need to improve data and information accuracy of medical waste generation and management in real-time by each health care facility as a basis for policy making process.
- The government and local health care facilities need to optimally use and maximized the management of medical waste information system in the regions.

Therefore, at the end of 2020, the Ministry of Health through the Environmental Health Directorate requested UNDP permission to help develop an efficient, integrated, and easy-to-use management information system for better and more timely decision making with accurate recording and reporting.

UNDP Indonesia is currently looking for an IT Company to generate and/or develop the electronic monitoring system for medical waste and logistics in strengthening medical waste management. It will provide an integrated solution to address widespread inequities in medical waste management at local to national entities, from Community Health Centers (Puskesmas) to the hospitals. This initiative will be fully supporting the government in overcoming constraints of infrastructure, monitoring, recording, and information system management on medical waste in every level of health facility, and as well as capacity building for health workers. The integrated solution is a combination of good governance, technology, innovation, and human resources.

The IT Company will provide a real-time information on all waste management levels from mobile devices to fulfill the core functions. The system will present more functions or so called being smart, automatic, and enhanced like performing medical waste projections and delivery plan at the local level to the national level, build smart and automatic new interface with QR code and electronic weighing scale monitoring devices, as well as customized reporting as required by the national and sub-national decision makers. All medical waste stocks are digitalized by a trained medical waste handler (MWH) through a smartphone application and the data will be uploaded on a cloud server. This real-time data can then be viewed and aggregated on a web application-based dashboard by every focal point at health care facility, district, province, and national levels.

2 Objectives

1. Develop application (hardware and software) for Medical Waste Management Information System (WMIS) in Indonesia, which divided into 3 different development phases. The implementation of phase 2 and 3 subject to budget availability and vendor performance.
2. Provide technical assistance on operation, system administration, application software, troubleshooting, and hardware maintenance following at user site to UNDP, MoH and MoEF.
3. Provide training for focal point and develop the training module (audio-visual and manual guide) needed for users and focal point at local to national levels and pilot implementation in:
 - 2 Sites within 2 Provinces in DKI Jakarta and DI Yogyakarta (Phase 1),
 - 30 Sites within 5 Provinces in Jakarta, Banten, DI Yogyakarta, Surabaya & Denpasar (Phase 2),
 - 80 Sites within 9 Provinces in Jakarta, Banten, DI Yogyakarta, Surabaya, Denpasar, Padang, Balikpapan, Manado, & Makassar (Phase 3).

3 Expected Outputs

1. Mobile and web application, and digital scale or smart devices (IOT) for medical Waste Management Information System (WMIS) in Indonesia, started with 2 targeted provinces (Jakarta and DI Yogyakarta) as pilot projects with electronic medical waste monitoring devices for development phase 1. The implementation of phase 2 and 3 subject to budget availability and vendor performance.
2. Training in operation, system administration, application software, troubleshooting and hardware maintenance following at user site to UNDP and MoH including development of the training modules (audio-visual and manual guide).

4 Scope of Work

UNDP would require assistance from the IT Company in the following areas:

4.1 Software Development

1. The software is providing medical waste monitoring solutions for focal point at Province and District level. There is a need based on evidence and experience by the Ministry of Health, to develop software that will enable focal point to track medical waste from Community Health Centers (Puskesmas) and Hospital level. This enhancement will offer a greater degree of control and oversight to the National Environmental Health Directorate on medical waste monitoring solutions and will be developed in consultation with the head Director of Environmental Health (MoH), Government of Indonesia.
2. The software will integrate and record to monitoring and tracking different activities from medical waste segregation, storage, collection, transportation, and treatment. It must link all parties and their database in the chain: Directorate General of Public Health (one of its Directorates is the Environmental Health Directorate) of the MoH, Directorate General of Waste, Hazardous, Toxic and Waste Management (PSLB3) of the MoEF.
3. Coordinating with related technical parties as the person in charge of business processes (MoH) and data as well as stakeholders to harmonize and identify application needs.
4. Implement medical waste tracking with QR code sticker scanning, smart weighing scale monitoring (IOT), and automation data inputs, process, and output/report generation (such as SIKELIM by MoH and similar apps by MoEF) for 2 targeted provinces (DKI Jakarta & DI Yogyakarta).
5. IT Company should develop the application feature as modular app when the service needed will simply to add based on information system flexibility and scalability (the application and all its equipment should be able to be updated and upgraded).
6. IT Company should implement the project base on agility framework to provide flexibility for change and adjustment in features and requirement during development and implementation. (Setting in sprint goal to deliver related product result/Scrum Methodology).
7. IT Company are required to provide software or tools for project management and monitoring in strengthening synergy and open communication and involved all project resources, including Stakeholder for every level (UNDP and MoH). This tool should be having progress dashboard also easy and simple to access and operate.
8. The software must be based on open-source platform with no license or subscription costs for any operating system, application & databases.
9. IT Company should provide unlimited user for the pilot projects.

10. IT Company must prepare its own basic environment for build applications (such as Design, flow/diagram, Language Programming, Libraries, API Framework, etc.).
11. IT Company is obliged to prepare all databases and IDE Tools themselves to create scripts, application database structures, and software testing tools automatically.
12. IT Company are required to prepare their own database systems to build a data storage architecture.
13. IT Company prepares its own Laptop and Phone Device (for porting and testing IOS or Android applications). Applications that will be developed are supported by the latest technology that has a long time to support and update/upgrade, and preferably non-proprietary.
14. In the core module of medical waste management, the software will integrate as detailed below:
 - a. **Integrated medical waste dashboard information** for any related decision makers
 - b. **Develop tracking application** for waste monitoring and reporting.
 - c. **QR code** sticker maker and scanner, smart scale monitoring devices (IOT), artificial intelligence and machine learning capability for dashboard information (included but not limited to automatic report generation, waste management prediction/projections/ forecast, etc.,).
 - d. **User experience** (UX Design Capabilities) for enhancing application user interface.
 - e. **Integration with existing information system** such as, Sikelim, SMILE, & National Health One Data by MoH through APIs.
 - f. **Automation data inputs/bridging** from Sikelim, SMILE, & National Health One Data by MoH

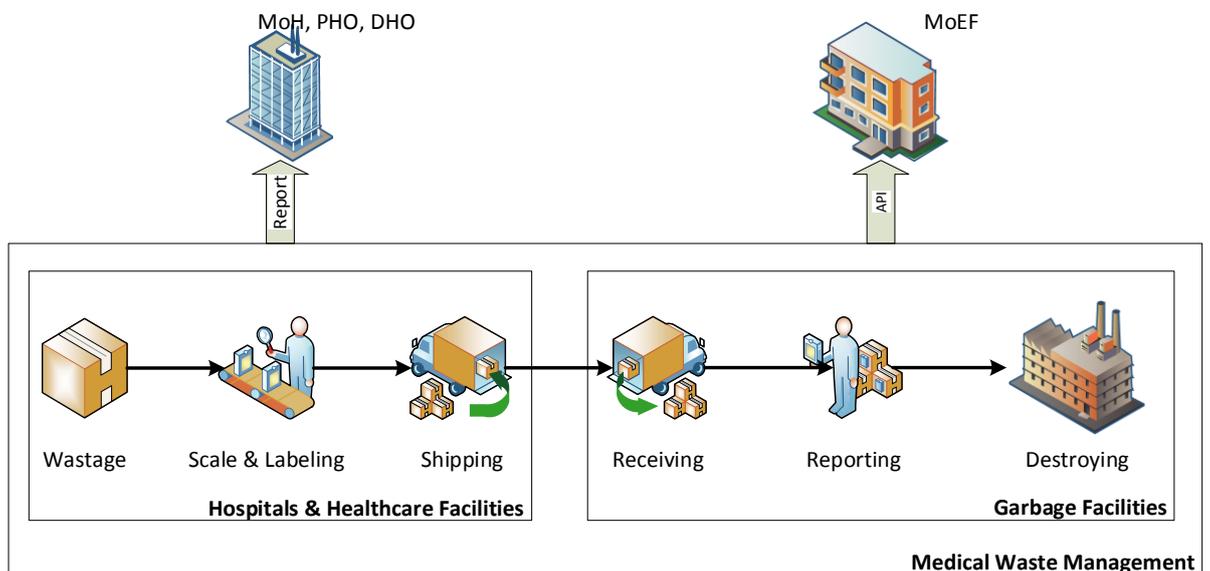


Figure 3. Medical Waste Management Core Module

15. The application to be developed has a management feature for Dynamic API to support data exchange and integration with other related applications according to interoperability standards and ready to be registered and stored in the application repository.
16. The application to be developed has dynamic reporting features that can be designed by application users.
17. The application provides an electronic signature process for documents generated from the system.

18. Ensure that the application to be developed has a feature to manage user authorization (level access), and supports multi-factor authentication, which can be developed in the future into a single sign on authorization base on regulation.
19. Web apps: enhance and provide the analytical dashboards in supporting decision for users at higher echelon, including ad hoc customized reports for UNDP as and when the needs arise.
20. Forecasting and optimization algorithms, using pattern recognition and predictive analytics to better predict bottlenecks and further suggest real-time workarounds (Development Phase 2).
21. The developed software must pass User Acceptance Test (UAT) and System Integration Test (SIT) from the user.
22. IT Company provide technical documentation such as Digital Scale & QR Printer Installation Guide and Online Guidelines (Technical Guide & User Guide).

4.2 Hardware Development

Hardware development for IOT Devices which consist of (Label Printer, Digital Scale, QR Code Scanner and GPS Geo Tracking Devices)

1. Develop smart device (IOT): medical waste QR code scanner (Mobile app) as medical waste identification and capture waste serial number.
2. Develop automatic QR code maker and sticker printing from mobile and web app (Wireless and Android, iOS, Windows, MacOS compatible).
3. Provide QR Code mobile printer simple to setup and high-level durability with capability of smartphone connection. The device at least 4" QR Code Thermal Printer, Industrial Grade, Wi-Fi capabilities.
4. Develop smart device (IOT): smart automatic weighing scale monitoring with mobile app. The device or Digital Scale support Min 150 Kgs, Industrial Grade, Wi-Fi capabilities & connect to Printer.
5. Develop and provide smart device (IOT) weighing scale with 0.05 kg level of accuracy.
6. Develop the system to be mobile compatible with both Android and IOS smartphones.
7. Develop GPS Geo Tracking Devices. An integrated electronic GPS track that are combined with Global System for Mobile communication (GSM) to locate the vehicle and monitoring the movement in one device with real-time alert. The device is automatically added to the system as part of back-end service; therefore, users do not need to manually install the device on arrival. (Development Phase 3).

4.3 Implementation

1. IT Company have to carry out proper testing of all these system before deployment of code on the system for 2 targeted provinces as pilot projects.
2. These testing may include (but not limited to) performance testing, load testing, functional testing, security testing, user experience testing, etc.
3. IT Company shall be responsible for installation, integration, user acceptance testing and commissioning, and troubleshooting (if needed) of the system to the full satisfaction of the UNDP/MoH. Test equipment and special tools, if any, required for system integration are to be provided by IT Company.
4. Bilingual settings in core and enhanced functions in mobile and web-based applications.
5. IT Company will be working closely with Government Entity which will be communicated in Bahasa Indonesia. Thus, the IT Company should be fluent in Bahasa Indonesia as their working language.

4.3.1 Medical Waste Tracking and Monitoring Modules Development Phase 1

The software development process will be implemented within 3 months after contract signing.

This would consist of following module and would be implemented in 2 Health Facilities, 2 District Health Office, 2 Province Health Office & Ministry of Health Office (Jakarta & Yogyakarta).

<p>Mobile Apps (Healthcare Facility)</p> <ul style="list-style-type: none"> • User registration • MFA (Multi factor Authenticating) support • Data entry for Medical Waste identification (include input & wastage classification, wastage processes & transportation) • QR code printing and scanning • Weight scale recording (automatic, smart/IOT and Manual) • Medical Waste tracking report • Related analytical information as request by MoH. • Notification and alert management • Transaction Report 	<p>Web Apps (Healthcare Office). Include all features in Mobil Apps plus :</p> <ul style="list-style-type: none"> • Dashboard Report & Export Tools of waste management • Dashboard map (area and point) and graphic/chart view • Dashboard view in Sikelim Site • Report transaction • Filter/search report based on category • Export report • Waste Management Main Features • Configuration management • User Management • Dashboard Management • Notification and alert management • Conversion table • Realization management, integration API management • Web QR Code printing • Medical waste tracking report • Analytical report • Notification and alert management • Integration API management to “SIKELIM”
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4.3.2 Medical Waste Tracking and Monitoring Modules Development Phase 2

This would consist of following module and would be implemented in 30 Health Facilities, 6 District Health Office, 5 Province Health Office (DKI Jakarta, Banten, DI Yogyakarta, East Java and Bali), 5 Wastage Processing, and Ministry of Health Office.

<p>Mobile Apps (Healthcare Facility & Wastage Processing)</p> <ul style="list-style-type: none"> • Enhancement for data entry for Medical Waste identification (include input & wastage classification, wastage processes & transportation) • Enhancement for additional QR code printing and scanning • Enhancement Medical Waste tracking report 	<p>Web Apps Enhancement (Environment Office & Healthcare Office). Web Apps (Healthcare Office). Include all features in Mobil Apps plus :</p> <ul style="list-style-type: none"> • Enhancement Dashboard Report & Export Tools of waste management • Enhancement Dashboard map (area and point) and graphic/chart view • Enhancement Dashboard view in Sikelim Site • Additional Report transaction
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<ul style="list-style-type: none"> • Additional analytical information as requested by MoH & MoEF • Enhancement feature for Reporting • AR & VR feature for wastage e-learning 	<ul style="list-style-type: none"> • Help Desk: User View • Help Desk: Homepage • Help Desk: Admin View • FAQ management • Support ticket • Enhancement Waste Management Main Features • Additional integration API management to “SIKELIM”, “SMILE” or similar system • Web QR Code printing • Additional Analytical and Medical waste tracking report as requested by MoH & MoEF • Forecasting and optimization algorithms for wastage management
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4.3.3 Medical Waste Tracking and Monitoring Modules Development Phase 3

This would consist of following module and would be implemented in 80 Health Facilities, 12 District Health Office, 9 Province Health Office (DKI Jakarta, Banten, DI Yogyakarta, East Java, Bali, West Sumatra, East Kalimantan, North Sulawesi & South Sulawesi), 9 Wastage Processing, and Ministry of Health Office.

<p>Mobile Apps (Healthcare Facility & Wastage Processing)</p> <ul style="list-style-type: none"> • Enhancement for data entry for Medical Waste identification (include input & wastage classification, wastage processes & transportation) • Enhancement for additional QR code printing and scanning • Enhancement Medical Waste tracking report • Additional analytical information as requested by MoH & MoEF • Enhancement feature for Reporting • Enhancement AR & VR feature for wastage e-learning • Geo Fence & Tracking for Wastage 	<p>Web Apps Enhancement (Environment Office & Healthcare Office). Web Apps (Healthcare Office). Include all features in Mobil Apps plus :</p> <ul style="list-style-type: none"> • Enhancement Dashboard Report & Export Tools of waste management • Enhancement Dashboard map (area and point) and graphic/chart view • Enhancement Dashboard view in Sikelim Site • Additional Report transaction • Enhancement Waste Management Main Features • Additional integration API management to “SIKELIM”, “SMILE” or similar system • Web QR Code printing • Additional Analytical and Medical waste tracking report as requested by MoH & MoEF • Enhancement Forecasting and optimization algorithms for wastage management • Geo Fence & Tracking for Wastage
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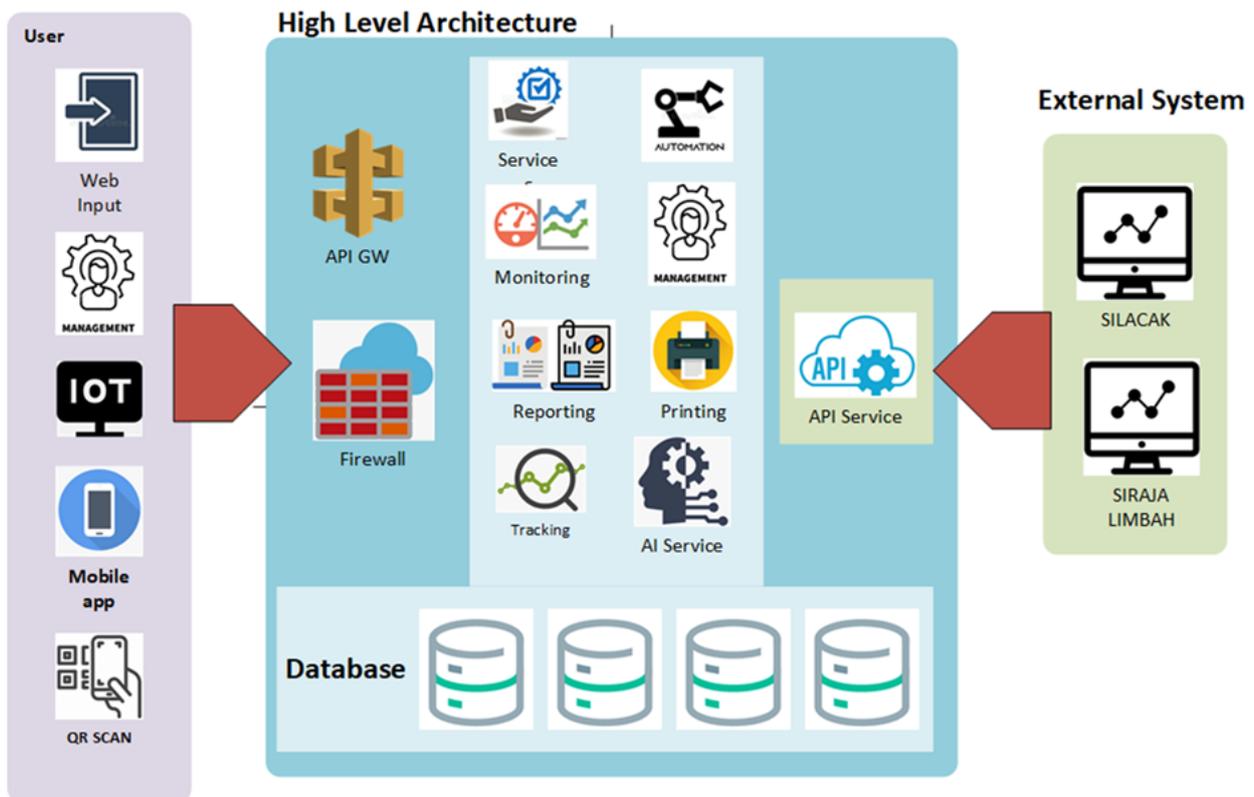
4.3.4 Application Feature

Highly desirable but not limited those applications to be developed will provide some features:

- Detection unusual waste disposal activities by using pattern recognition and predictive analytics.
- Geographical information system of area and/or point map on health care waste management.
- Health care waste transportation geofencing integration with Silacak from MoEF.
- Public medical service reputation in awareness of medical waste activities.
- Early warning notification for outstanding waste activities in recent area.
- Automation input for other system based on this application record.

4.3.5 Application Infrastructure

The software company will develop and design high availability infrastructure base with supervision by UNDP and the MoH at an external cloud provider. Moreover, an integration with MoH Data Center (private cloud) will become the selected IT Company responsibility in the future. With assumption concurrence access will be more than 10,000 users. Server and database pairing and synchronization possible need to implement between both infrastructures.



4.3.6 Application Security

The software company will be developing, adding, and testing security features within applications to prevent security vulnerabilities against threats such as unauthorized access and modification. This process in line with MoH Data Center security feature prerequisite may include hardware, software, and procedures that identify or minimize security vulnerabilities.

5 Technical Assistance

- Conduct meeting for Sprint process report, documentation, and product delivery.
- IoT Services for medical waste monitoring with new alternate devices.
- Technical consultation about the business process of this application with all levels of parties in MoH, Medical Services and related ministries.
- Technical development support at all levels for the latest product features by fixing bugs through call centers and site visits.
- Software support – explicit tracking of bugs and change requests and access to UNDP to monitor the performance and issue resolution.
- Maintenance Support - explicit tracking of bugs and change requests and access to UNDP to monitor the performance and issue resolution.
- Load Testing for the system with data from pilot and new locations.
- Server Deployment Support with new cloud provider.
- Provide the help desk ticketing on the troubleshooting of the software for health facilities.
- Produce transaction logs from the system as for program records.
- Documentation support which includes updates and review of user manuals, creation/modifications of SOP's and troubleshooting guides.
- Training support i.e., training of master trainers, training for end users and Data Analysis from Reporting System at pilot and new locations.
- All the documentation provided shall be in Indonesia and English and a set of all documentation should be provided in online and hard disk drive and approved by UNDP Indonesia.
- The documentation should contain a full technical description of the site preparation, equipment installation, operation, maintenance and servicing details, component details.
- The documentation shall also contain technical documentation all software upgrades/additions including detailed system design documentation (updated for every logical piece of construct within the code), theoretical considerations, logic diagrams, flowcharts, explanations, etc.
- Database structure documentation (ER diagram, stored procedures, functions, triggers, views etc.) including backup mechanism should also be provided in collaboration with MoH.
- System monitoring – develop additional features for the smartphone and web application that enable data capturing on key output/process indicators of the project and can be downloaded as a project report.
- Software Maintenance for 8 months which includes:
 - Expert level guidance and troubleshooting in connection with questions and issues arising from the installation and use of the software
 - Online support for troubleshooting or guidance
 - On-site support for troubleshooting or guidance if required (max. 4 days per month in Jakarta Area)
 - Bug fixes and issue resolution with ticketing system.

6 Work Assignment Mechanism

- IT Business Company will submit the technical and financial proposals along with the company profile. The technical proposal would entail system architecture, methodology, proposed software used, expert resources, detailed time schedule for delivery, installation, system

integration, acceptance tests and commissioning along with resources required and justification and any other requirement whereas the financial proposal should be a lump-sum, fixed amount proposal based on the unit rates agreed for each resource.

- UNDP will evaluate the technical proposal and verify the manpower and man-days proposed to complete the task.
- UNDP will issue the SOFTWARE LICENSE AND SERVICES AGREEMENT including the rights of source code. The license will belong to UNDP.
- IT Business Company will submit technical documentation and monthly regular activity report.
- Payment will be linked to agreed deliverables.
- UNDP envisages on possibility for extension in the 2nd and 3rd years for phase 2 and 3, maintenance, and service fee.
- The development phases are divided into 3 separate phases as follows:



Figure 4. Development Phase

7 Requirement of Experience and Qualifications

The development of Waste Management Information System WMIS will involve an IT Company. Some of the minimum qualifications that the IT company need to have include:

- The IT company must be a registered legal entity
- IT Company should have minimum 3 relevant projects in terms of similar complexity (e.g. technology stack, & no of users) within 5 years experiences on developing, implementing, and managing web or mobile software application development.
- IT Company should have experts minimum resources in Project Manager, Business Analyst, Full Stack Developer, Mobile Apps Developer, UI/UX Designer, Software QA Engineer & Technical Writer.
- Well-versed in web-based and mobile enterprise application platform.
- Having the experience and skills to build the cloud computing infrastructure and on-premises using container technology (e.g., Docker, Kubernetes, OpenShift).
- Selection criteria during presentation will be having solid development methodologies and automated testing to ensure quality of end products.

In the process, it is recommended that the selected IT Company has several mentioned expert resources with required experience and submit their detailed CVs with the following categories and specifications:

1. Project Manager (1 person)

The Project Manager will serve as the leader of this project development by preparing a proposed methodology and detailed design related to the product development plan. He/she should have technical leadership and implement the proposed product development plan. Some of the requirements related to the project manager for this project are:

- Bachelor's Degree in computer science, Engineering, Information Technology, or related field.
- Have at least 5 years' experience and a portfolio leading the development team of a web or mobile application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a must.
- Have experience in development and implementation SQL & NoSQL database software such as Maria DB, Mongo DB, MySQL, Microsoft SQL Server, Postgre SQL or similar software is a must.
- Have experience in development and implementation technology in supply chain or logistics such as Barcode, Digital Scale, Internet of Thing (IoT), GPS Track, Scanner or RFID is a plus.
- Have experience in development bigdata solution, dashboard and report using business intelligence software such as, Apache Superset, Kibana, Google Data Studio, Metabase, Microsoft Power BI, Tableau or similar software is a plus.

2. Business Analyst or System Analyst (1 person)

A systems analyst is a person who responsible uses analysis and design techniques to solve business problems using information technology. He/she will evaluate the business need and identify the appropriate solution and, to some degree. He/she also may serve as change agents who identify the organizational improvements needed, design systems to implement those changes, and train and motivate others to use the systems. Some of the requirements related to the Business Analyst or System Analyst for this project are:

- Bachelor's Degree in Computer Science, Information Technology, Engineering, or related field.
- Have at least 5 years' experience and a portfolio leading the development team of a web or mobile application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a must.
- Have experience in development and implementation SQL & NoSQL database software such as Maria DB, Mongo DB, MySQL, Microsoft SQL Server, Postgre SQL or similar software is a must.
- Have experience in development and implementation technology in supply chain or logistics such as Barcode, Digital Scale, Internet of Thing (IoT), GPS Track, Scanner or RFID is a must.

- Have experience in development bigdata solution, dashboard and report using business intelligence software such as, Apache Superset, Kibana, Google Data Studio, Metabase, Microsoft Power BI, Tableau or similar software is a plus.
- Have knowledge on Microservices Architecture and have experience in implementation operating system and container software such as, Linux Docker, Kubernetes or similar software is a must.
- Have experience in REST API, software development using programming languages and framework (e.g., Android, Node JS, PHP, Python and SQL) to create a running and functioning a quality program is a must.

3. Full Stack Developer (2 person)

A full-stack web developer is an engineer who works with both the front and back ends of a website or application. This means they can lead platform builds that involve databases, user-facing websites, system testing and working with clients during the planning phase of projects.

Some of the requirements related to the Full Stack for this project are:

- Bachelor's Degree in Computer Science, Information Technology, Engineering, or related field.
- Have at least 3 years' experience and a fully functioning portfolio of a web-based application or mobile application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a must.
- Have experience in development and implementation SQL & NoSQL database software such as Maria DB, Mongo DB, MySQL, Microsoft SQL Server, Postgre SQL or similar software is a must.
- Have experience in development and implementation technology in supply chain or logistics such as Barcode, Digital Scale, Internet of Thing (IoT), GPS Track, Scanner or RFID is a plus.
- Have experience in development bigdata solution, dashboard and report using business intelligence software such as, Apache Superset, Kibana, Google Data Studio, Metabase, Microsoft Power BI, Tableau or similar software is a plus.
- Have knowledge on Microservices Architecture and have experience in implementation operating system and container software such as, Linux Docker, Kubernetes or similar software is a must.
- Have experience in REST API, software development using programming languages and framework (e.g., Android, Node JS, PHP, Python and SQL) to create a running and functioning a quality program is a must.

4. Mobile Application Developer (2 person)

A mobile developer is responsible for translating code into user-friendly applications. He/she collaborate with internal teams to develop functional mobile applications while working in a fast-paced environment. Mobile developers develop application programming interfaces (APIs) and contribute to the design, testing, releasing and support of the application. Some of the requirements related to the Mobile Application Developer for this project are:

- Bachelor's Degree in Computer Science, Engineering, Information Technology, or related field.

- Have at least 3 years' experience and a fully functioning portfolio of a web-based application or mobile application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a must.
- Have experience in development and implementation SQL & NoSQL database software such as Maria DB, Mongo DB, MySQL, Microsoft SQL Server, Postgre SQL or similar software is a must.
- Have experience in development and implementation technology in supply chain or logistics such as Barcode, Digital Scale, Internet of Thing (IoT), GPS Track, Scanner or RFID is a plus.
- Have experience in development dashboard and report using business intelligence software such as, Apache Superset, Kibana, Google Data Studio, Metabase, Microsoft Power BI, Tableau or similar software is a plus.
- Have knowledge on Microservices Architecture and have experience in implementation operating system and container software such as, Linux Docker, Kubernetes or similar software is a must.
- Have experience in REST API, software development using programming languages and framework (e.g., Android, Node JS, PHP, Python and SQL) to create a running and functioning a quality program is a must.

5. UI/UX Designer (1 person)

The UI/UX Designer creating user-centered designs by understanding business requirements, and user feedback. Creating user flows, wireframes, prototypes, and mockups. Translating requirements into style guides, design systems, design patterns and attractive user interfaces. Some of the requirements related to the UI/UX Designer for this project are:

- Bachelor's Degree in Computer Science, Graphic Design, Information Technology, or related field.
- Have at least 3 years' experience and a fully functioning portfolio of a web-based application or mobile application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a plus.
- Have experience using design, prototype, or wireframe software tools (e.g., Adobe Illustrator Balsamiq, Figma, InVision, Photoshop or Wireframe.cc).
- Have experience in software design, web design, etc. using programming languages, web component and UI/UX library (e.g., data tables, fusionchart, webix) to create a running and functioning a quality program is a must.

6. Software Quality Assurance (SQA) (1 person)

SQA engineers, or software quality assurance engineers, evaluate and test software to ensure it meets the specifications and standards established by the software development team or the client, and that it's delivered on time. He/she also responsible for creating technical documentation. Some of the requirements related to the Software Quality Assurance for this project are:

- Bachelor's Degree in Computer Science, Engineering, Information Technology, or related field.

- Have at least 3 years' experience and a fully functioning portfolio of a web-based application or mobile application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a must.
- Have experience in development and implementation SQL & NoSQL database software such as Maria DB, Mongo DB, MySQL, Microsoft SQL Server, Postgre SQL or similar software is a must.
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- Have knowledge on Microservices Architecture and have experience in implementation operating system and container software such as, Linux Docker, Kubernetes or similar software is a must.
- Have experience in REST API, software development using programming languages and framework (e.g., Android, Node JS, PHP, Python and SQL) to create a running and functioning a quality program is a must.
- Have experience with automatic testing software tools such as Apache JMeter, Avvo Assure, Postman, Selenium or similar software is a must.

7. Developer Operations (DevOps) (1 person)

DevOps Engineers are collaborating with software developers, system operators and other IT staff members to manage code releases. He/she responsible for infrastructure design, software deployment and implementation. He/she strive for continuous improvement and build continuous integration, continuous development, and constant deployment pipeline (CI/CD Pipeline). Some of the requirements related to the DevOps for this project are:

- Bachelor's Degree in Computer Science, Engineering, Information Technology, or related field.
- Have at least 3 years' experience and a fully functioning portfolio of a web-based application or mobile application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a must.
- Have experience in development and implementation SQL & NoSQL database software such as Maria DB, Mongo DB, MySQL, Microsoft SQL Server, Postgre SQL or similar software is a must.
- Have experience in development and implementation technology in supply chain or logistics such as Barcode, Digital Scale, Internet of Thing (IoT), GPS Track, Scanner or RFID is a plus.
- Have knowledge on Microservices Architecture and have experience in implementation operating system and container software such as, Linux Docker, Kubernetes or similar software is a must.
- Have experience in REST API, software development using programming languages and framework (e.g., Android, Node JS, PHP, Python and SQL) to create a running and functioning a quality program is a must.
- Have experience with CI/CD software tools such as Jenkins, GitLab CI/CD, Travis CI or similar software is a must.

8. Internet of Things IoT Developer (1 person)

An IoT developer is responsible for setup, testing and implementing IoT devices required. The IoT devices required are Digital Scale & GPS Track Devices. He/she collaborate with internal teams to develop iot applications while working in a fast-paced environment and develop application programming interfaces (APIs) and contribute to the design, testing, releasing and support of the application. Some of the requirements related to the Internet of Things IoT Developer for this project are:

- Bachelor's Degree in Computer Science, Engineering, Information Technology, or related field.
- Have at least 3 years' experience and a fully functioning portfolio of a Internet of Things IoT application software.
- Have experience in development using GitHub and implementation in Cloud Platform such as AWS, GCP, Microsoft Azure or similar platform is a plus.
- Have experience in development and implementation SQL & NoSQL database software such as Maria DB, Mongo DB, MySQL, Microsoft SQL Server, Postgre SQL or similar software is a plus.
- Have experience in development and implementation technology in supply chain or logistics such as Barcode, Digital Scale, Internet of Thing (IoT), GPS Track, Scanner or RFID is a must.
- Have experience in REST API, software development using programming languages and framework (e.g., Android, Node JS, PHP, Python and SQL) to create a running and functioning a quality program is a plus.

9. Technical Writer (1 person)

The Technical Writer will be responsible for documenting the project, create user report, create web content related to data dissemination. Some of the requirements related to the Technical Writer for this project are:

- Diploma's Degree in Computer Science, Engineering, Information Technology, or related field.
- Have at least 3 years' experience and a portfolio as content writer or technical report related to data dissemination.
- Have research capabilities and excellent communication skills to public user.
- Have experience writing in English and Bahasa.

10. Technical Support (1 person)

The Technical Support will be stationed in implementation site, responsible for training users, guiding users, perform data entry, and provides 1st level troubleshooting for software and hardware. Some of the requirements related to the Technical Support for this project are:

- Diploma's Degree in Social Science, Healthcare, Engineering, Information Technology, or related field.
- Have at least 3 years' experience and a portfolio as technical support related to software or project implementation.
- Have experience in mobile and web application technology implementation.

- Customer oriented and excellent communication skills to public user.
- Have experience healthcare, sanitation or similar project would be an advantage.

8 Payment

Payment will be made based on deliverables and after satisfactory acceptance by UNDP the services provided on the following schedule:

No.	Deliverables for Core Functions (Main Contract)	Payment Schedule (%)	Est. Due Dates
1	Design Report on: <ul style="list-style-type: none"> • Conceptual Design for Software (offering proposal consist of details and goals of the project). • Technical Design Online Document (e.g., Functional Specification, ER Diagram, Test Plan). • Prototype (Design Mock-up) of System in IOT, mobile, web application, and core modules. 	20 %	February 2022
2	Passing User Acceptance Test (UAT), System Integration Test (SIT), Digital Scale & QR Printer Installation and Online Guidelines (Technical Guide & User Guide) Implemented & working software with: <ul style="list-style-type: none"> • Piloting and testing app phase 1 (for all waste tracking and monitoring features). • Go live implementation (for the rest of the features) in MoH server. 	40 %	April 2022
3	Training for Focal Points and User at targeted provinces for the pilot projects Final Report (BAST Document) Implemented & handover working software with: <ul style="list-style-type: none"> • Credentials for Email and Cloud Console access for Setup Server as Super Admin level • Source Code, Database & Related Contents 	30 %	May 2022
4	Software Maintenance for 8 months which includes: <ul style="list-style-type: none"> • Expert level guidance and troubleshooting in connection with questions and issues arising from the installation and use of the software • Online support for troubleshooting or guidance • On-site support for troubleshooting or guidance if required (max. 4 days per month in Jakarta Area) • Bug fixes and issue resolution with ticketing system 	10%	December 2022
	Total	100 %	