



# Technical support to upgrading the solid waste management capacities in Lebanon

"Contract number: ENPI/2017/389-095"

## *ADD HOC REPORT* SCREENING TOOL FOR WASTE TREATMENT TECHNOLOGIES

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**IDOM SAY**

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## Introduction

This screening tool is prepared as a response to the recent phenomenon in which several municipalities and authorities in Lebanon are facing proposals to build “innovative” waste treatment plants powered by technologies that are not always reliable, commercially available and well-tested. As a result, OMSAR requested the consultants to prepare a screening tool that could be used by anyone that requires it. The proposed screening tool aims to identify if the proposals in place are capable to pass a basic reliability test. In case they are capable to pass this reliability test, then further discussions and a detailed examination of the proposed technologies are possible, based on the specific costs and benefits of each technology. In case the proposed technologies can’t pass the reliability test, as described below, it is suggested that local authorities should be very careful in continuing further discussions, as the proposed facilities do not meet the minimum standards for a sound operation that will provide health and environmental protection.

## Why we need a screening tool?

Good decision-making is of central importance in supporting sustainable improvement to waste management practices. Decisions taken in this sector impact on the ability to provide essential public services, improve the health and living conditions of citizens, protect the environment, limit emissions of greenhouse gases, and maintain the financial health of local, regional or national Government.

Last twenty years are characterized by the rapid expansion of the available Solid Waste treatment and disposal technologies. Besides the traditional proven and commercial Mechanical Biological Treatment and Incineration technologies, gasification, thermolysis, pyrolysis, plasma treatment and several versions of anaerobic digestion technologies are now discussed and pushed in the markets. So, the problem of the selection of the appropriate treatment and disposal scenario for each case becomes a very difficult problem, without a simple or single solution. There are three more causes that make the problem very difficult:

- In most of the cases there is a very big confusion regarding the investment and operational costs.
- A lot of the pronounced “innovative” technologies are developed inside the laboratories of companies and so the access to real data about their products is practically impossible.
- Especially in the developing world, a lot of the proposals build on the lack of knowledge regarding the scientific methodologies that can be used in order to evaluate the feasibility of each treatment and disposal technology.

A lot of such companies promote their products in a way that makes impossible the understanding of their real value and sometimes they seem to have some kind of “magic” and zero cost solutions that makes them very attractive.

These offers may promise to not only solve the waste management problem but also other pressing concerns.





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Amongst these increasingly numerous offers, many are fake, some even bordering on the fraudulent. That is not to say that all technology offers are dubious. Many remain genuine and credible and have the potential to deliver compelling outcomes which are worthy of serious consideration, however this depends a lot on the specific waste input (quantities and composition).

Technology is an essential part of any waste management system. Selecting between different technological options can be a very confusing task at the best of times and it has become increasingly difficult for decision makers to take a good decision and one which is right for their specific municipality.

The choice of the appropriate treatment and disposal technology is not a pure technical issue; it is much more concerned with the financial resources and the organization and management of relationships between all the key actors or stakeholders. So, it must be faced as an interactive process for all the involved parts that scopes to find affordable solutions in a strategic view. In fact, there is a rule of thumb: every step that is done must be well connected with the possible next steps or in reverse no step must be done if it is not correlated with the whole strategic planning.

Another useful remark is that when someone must decide about the treatment and disposal technologies, emphasis must be given to Whole and not to Part. It is always valuable to remember that protection of Human Health and the Environment can only become because of a Systemic Approach where the whole problem is faced. Therefore decision-makers should keep in mind the Comparative Principle: All the actions that require expenditures of resources must be justified in the context of opportunity cost, i.e. the potential of achieving the same goals more efficiently in doing something else.

The proposed screening tool has been created to help those responsible for the commissioning of waste management solutions to navigate the offers before them, enabling them to ask the right questions and carry out the research needed in choosing a technology solution. The tool is based on the consultant's experiences from several countries as well as in selected papers and assessment tools (see References at the end of the tool).

The tool is structured in a form of simple actions or questions that should be answered either by the ones that make a specific technology offer or by the authorities' own investigation. The following sections of questions are presented below.

1. About the Proposer
2. About the proposed cooperation
3. About the technology



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## About the Proposer

The idea of this check-list is to assess the proposer’s credentials and the real capabilities of the proposer to deliver what he is promising or proposing. Note that this section has nothing to do with the technical and financial suitability of the proposal to the specific local context, it’s just an elementary reliability check to avoid fraud.

1. ABOUT THE PROPOSER	
QUESTIONS / ACTIONS	TIPS
<p>1.1 Check the proposer’s website - Check if the company has a website – then make simple things like:</p> <p>a) Enter the company address into Google Maps (or similar) to see if the address does physically exist</p> <p>b) Call at the company’s headquarters and ask about their work, or even better ask for a meeting</p>	<p>If the website is a simple one, without technical details, particular information and project references, then you better reconsider to discuss again.</p>
<p>1.2 Run the company or consortium through a search engine (i.e. Google) and check that:</p> <p>a) they exist,</p> <p>b) their ownership structure</p> <p>c) their management structure</p> <p>d) their size, locations</p> <p>e) their references</p>	<p>Search for their registration or VAT numbers – normal companies usually provide their registration or VAT numbers.</p>
<p>1.3 Who is involved in the company or in the consortium? Ask and research about:</p> <p>a) the names of the shareholders</p> <p>b) the names of directors (CEO, technical, financial)</p> <p>c) the key-personnel related to waste management</p>	<p>Assessing the capabilities, experiences and credentials of those involved can provide insights about the proposer – in case such an information is not available think twice.</p>
<p>1.4 Ask the company or consortium for a list of references (if not provided earlier) including its facilities and clients. Read the references and ask more details for some of them. If possible, find a project like the one they propose and ask to contact directly with the client to discuss about the project and the client’s satisfaction.</p>	<p>The idea is to make sure that they have already delivered a project like the one they propose. Don’t rely only upon references provided by the company; contact others directly identified on the company website or other sales literature.</p>
<p>1.5 Check the proposer’s financial capability.</p> <p>a) ask for the proposer’s financial statements for the last 3-4 years</p> <p>b) ask if the company is privately owned, listed on a stock exchange or funded through venture capital</p> <p>c) ask if they have sufficient line of credit with suppliers</p>	<p>It is important to ensure that a company has sufficient financial backing to remain in existence through the duration of a project. Remember though, that start-up companies still may not yet have amassed sound financial backing or good credit scores yet still offer a viable solution.</p>



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1. ABOUT THE PROPOSER	
QUESTIONS / ACTIONS	TIPS
<p>1.6 Check the proposer’s competitive advantages.</p> <p>a) are they ready to participate in public tenders or they are only discussing direct contracts, without procurement procedures?</p> <p>b) are they ready to issue guarantee letters that will ensure the facility’s sound operation?</p>	<p>In many cases, non-reliable proposers want to avoid public tenders because their proposals can’t compete with alternatives or they are not bankable (so they can’t issue a guarantee letter).</p>





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## About the proposed cooperation

The idea of this check-list is to help the authorities identify if they are ready to discuss the proposed cooperation from a policy and administrative point of view. Again, if the answers to the check-list below are positive for the potential cooperation, there are still technical and financial issues to be discussed before any decision should be made.

2. ABOUT THE PROPOSERD COOPERATION	
QUESTIONS / ACTIONS	TIPS
<p>2.1 Is the proposed cooperation based on a specific local, regional or national plan?</p> <p>a) If the answer is yes, please check if the proposal uses the same assumptions and if the proposal is in accordance with the plan</p> <p>b) If the answer is no, then there are two cases:</p> <ul style="list-style-type: none"> <li>• There is a plan but the proposal is not part of it – in this case, please check why the proposal is not included in the plan, or</li> <li>• There is no plan, so the suitability of the proposal should be justified during the implementation of the waste management plan</li> </ul>	<p>In any case, do not accept any proposal just because it is proposed – it is the municipalities’ task to plan the waste management activities in their areas. The decisions regarding the proper technologies are an integral part of the planning process and they must be made comparing all the available realistic alternatives.</p>
<p>2.2 What is the form of the proposal? If it is just a power point presentation, do not discuss it. Ask always for a detailed feasibility study that has enabled the identification of the most appropriate solutions in terms of local needs, conditions and capacities .</p>	<p>A feasibility study can always be checked by relevant experts – in such a study you can identify the level of professionalism and technical know-how involved. Consider carefully the scope of such studies to ensure that all aspects like liabilities, access to land, contractual guarantees etc. are properly covered.</p>
<p>2.3 Are the local authorities in need of such a proposal? Critical analysis of need is required to ensure that the proposal is appropriate to the local requirements in terms of waste composition, quantities, coverage and efficiency of collection services and availability of alternative facilities such as sanitary landfill sites.</p>	<p>In many cases, proposals are so generic that they can be applied in any place of the world, anytime from now to infinity - if the proposal is not based on an analysis of the local needs, most probably is not going to be effective or it is just a fake proposal with other hidden intentions. No serious investor will propose a waste management investment without an adequate analysis of the users’ needs.</p>
<p>2.4 Does the municipality have the institutional capacity to monitor and enforce regulatory compliance? What are the monitoring mechanisms available? What are the human resources required for</p>	<p>A waste management facility will operate for more than 15 years. Environmental impacts, daily</p>





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2. ABOUT THE PROPOSERD COOPERATION	
QUESTIONS / ACTIONS	TIPS
monitoring and supervision?	performance and health and safety issues must be continuously supervised and monitored from the public authorities. Even the best proposal can't be implemented without proper supervision and monitoring by the authorities.
2.5 What are the contractual arrangements proposed? If there are no proposed contractual arrangements, then there is a high risk of fraud. If contractual arrangements are part of the discussion, then ask a) what is the type of the proposed contract (BOOT, BOT, BOO etc.)? b) what will be the contract's duration? c) what are the guarantees provided and requested for? d) where the income of the proposer will come from (gate fees, energy, recyclables etc.)? e) are the municipalities requested to guarantee a specific annual or daily amount of waste to be delivered to the proposed facility? f) is it possible to make such a contract legally without a public tender?	It is important to understand the specific agreement proposed – just asking those questions to the proposers, you will understand if they have a concrete business proposal that is worthy to be discussed. Serious proposals, generally, include guaranteed minimum tonnage to be delivered to the facility, feedstock quality and composition, and timely payment of gate fees. Are you in a position to offer such guarantees for the agreed operational lifetime?
2.6 Long-term cooperation and contractual arrangements need to manage also the risks involved. Many things change in 15-20 years, including the waste generated, the waste composition, the legal framework, the financial strength of companies and municipalities etc. For every similar waste project there are social, financial, environmental and legal risks. Are the relevant social, financial, environmental and legal risks properly considered and fairly allocated in the proposal?	If the long-term risks are not addressed at all, probably the proposal is not a concrete business case. Try to define the relevant risks from the very beginning and check who is going to undertake them. Where risk falls with other authorities or institutions, do not assume this will be acceptable to them.
2.7 Check the financial details. a) does the project proposal have a breakdown of capital, operating and maintenance, and replacement costs? b) what are the unit costs per tonne of waste feedstock to be treated? c) what will be the difference comparing to the current costs and how the gap will be covered?	You must have a clear answer about the investment and the operational cost. If you have them, then check if the technical assumptions used in the proposal are reasonable and they include operational costs, wages, fuel, availability of maintenance services, spare parts and qualified personnel, etc. Many times, calculations are designed to give a low price by always taking the most optimistic assumptions.
2.8 What payment/gate fee conditionalities are requested? All	If the applicant does not indicate

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<b>2. ABOUT THE PROPOSERD COOPERATION</b>	
<b>QUESTIONS / ACTIONS</b>	<b>TIPS</b>
waste technologies require a gate fee to be paid to the facility operator for each tonne of waste delivered.	that a gate fee is required, ask them to confirm that in writing and be suspicious because this is quite strange. If gate fee is required, can it be effectively covered by waste user charges or other municipal waste management funds?
2.9 If the company making the proposal says that they will provide the capital investment, ask for financial statements and letters of credit from their banks, to substantiate their financial capacity to secure the necessary investment. If they can't provide it, how will the company will get the CapEx?	Even if such letters of credit and documents exist, take care to determine their validity, as it is very easy to forge such documents. Contact the financial institutions directly if in doubt.
2.10 Are the costs for waste transfer (to the facility), pre-treatment and disposal included in the cost calculations?	The final cost for the municipality must be completely estimated – hiding several cost centres manipulates the decisions.





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## About the technology

If the proposed solutions pass the above-mentioned check-lists about the proposer and the proposed cooperation, then it's time to deal with the technical aspects of the proposal. Here are some major issues that must be asked for.

3. ABOUT THE TECHNOLOGY	
QUESTIONS / ACTIONS	TIPS
<p>3.1 Is the proposed technology proven - commercial and well tested or it is under development?</p> <p>a) If the answer is yes, ask the proposer to provide a reference list with similar facilities and contact details of the operators – if the answer is no, there is no reason to make experiments with technologies that are not commercial</p> <p>b) If the answer is yes, it is suggested to do the following:</p> <ul style="list-style-type: none"> <li>• Check that the references are true by contacting clients</li> <li>• Check for how many years the facilities in the reference list are operational and when they were constructed and who was the contractor</li> <li>• Ask them to organise a site visit so you can see an operational facility by your eyes and you can have the opportunity to discuss with the operators</li> </ul>	<p>When we say that the facility should be proven – commercial, we mean that:</p> <ul style="list-style-type: none"> <li>• the facility should be operational at least for 3-5 years with good results</li> <li>• the facility is already tested about its environmental impacts</li> <li>• the facility's business models generates income and so it is bankable.</li> </ul> <p>In many cases, especially for several “innovative” proposals there are no reference lists and there is no facility to visit and see its operation. Even if there are reference lists, there are cases that they are not true, so you must confirm them. Last but not least, if you ask for a site visit and they refuse it, in one or another way (e.g. by saying that the facility is under construction or that currently it goes through maintenance etc.) then be sure that something goes wrong, especially if there is only one facility you can visit.</p>
<p>3.2 If you are satisfied with the answer in the previous question, then you must ask:</p> <p>a) what type of waste is treated in the referenced facility or facilities? Is it mixed municipal waste or specific fractions of it?</p> <p>b) what is the composition of waste treated in the referenced facilities? Is it a composition based on measurements or a theoretical approach based on other documents only?</p> <p>c) what is the minimum amount of waste required to have a viable facility of this type?</p> <p>d) are other types of waste (hazardous waste, tyres, agricultural waste etc.) and not just municipal feedstocks also planned to be used as well?</p>	<p>A usual problem is that the referenced facilities are not working with municipal waste but with specific fractions of it (e.g. gasification with plastic waste or tyres). Another usual problem is that the referenced facilities accept different waste streams to become viable and not only municipal waste – you must make sure what waste streams are required for a viable operation. This is also why you must</p>





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3. ABOUT THE TECHNOLOGY	
QUESTIONS / ACTIONS	TIPS
	know the composition of the waste that is treated in the referenced facilities and the minimum amount of waste required. Simply you will compare with your local amount and composition before the next steps. In addition, if someone is ready to invest millions of dollars for a waste management facility, it will be strange to avoid spending 5-10,000 dollars for a composition analysis that will allow the proposer to be sure that the waste input is the right one.
3.3 Ask for a detailed technical description of the proposed facility that will include: a) the pre-treatment phase b) the main physical-chemical and mechanical processes involved in the proposed facility c) the management of the residual waste d) mass and energy balances e) the environmental protection measures required and the anti-pollution equipment	If the proposer can provide such a detailed description, then you must use an expert to read them and provide an opinion about them. But in many cases, non-reliable proposers can't provide those details, so you better stop discussions with them. If they are not able to provide those details, probably they are not in the business.
3.4 Ask about the end-products and the residual waste. a) what are the end-products of the proposed technology? Is there any potential or existing market about them or they must be given for free? b) what is the quantity and composition of the residual waste? c) where the residual waste will be disposed of? Do relevant facilities exist in your area?	There is no real facility that produces zero residues and there are no real facilities that commercialise all the by-products. You have to make sure that consideration has been given, and you have also to check their compliance to relevant environmental regulations.
3.5 In a long-term agreement the quantities and composition of the waste input will certainly change. A certain characteristic of any reliable proposal is that the proposer has made a research about the existing waste streams and a forecast about the future quantities and composition. a) is there a forecast for the future waste streams and the changes in quantities and composition or the proposal is made assuming that the current conditions will last for the next 20-30 years? b) is the proposed facility ready to receive municipal waste after recycling has taken place or it might be a barrier for recycling programs?	It's reasonable to expect waste quantity to rise but think about the impact something like an economic downturn would have on this; also think about the impact of developing new recycling initiatives that will reduce access to plastics and papers, resulting in a lower calorific value input waste



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3. ABOUT THE TECHNOLOGY	
QUESTIONS / ACTIONS	TIPS
3.6 All reliable technologies have their own emission standards set and monitored for a long-time. Ask the proposer what emissions standards have the facility been designed to meet? Are these national or international standards? Ask the proposer to show you measurements from the emission measurement and the monitoring program in place is a similar facility.	If the proposal concerns a proven – commercial facility this type of information is very easy to be demonstrated – in case this type of information is not available, you might reconsider the reliability of the proposal.





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## Concluding remarks

There is a saying that if something looks too good to be true, it is too good to be true. When pressure exists to deal with a challenge as big as improving municipal waste management, it can sometimes be difficult to apply this logic to the technology offers before you. It is for this reason that this document has been produced; to help you make informed choices based upon proper due process.

The steps we have described in this document will be welcome by any reputable company offering any credible technological solution; they will have no problem with you asking the right questions about their projects and their references. Professional companies wish to have well-informed clients.

Others will come and go with glossy brochures, optimistic claims, and will move on quite quickly once you make it clear that you know what you are talking about, which with the aid of this document, you now do.

If you are exploring a particular technology offer, and we suggest using this Screening Tool before any agreement takes place. Always remember, one meeting, one brochure or few power points and videos of plants are not enough to make such a decision. Serious time and effort is needed to assess any proposal properly and there is no quick way for decision making without severe risk of failure. After using this Screening Tool there three options.

Option 1: you consider that either the proposal or the proposer (or both, as it usually happens) are not reliable and you can't continue any discussions with them.

Option 2: you are sure that the proposal is serious and well defined and the proposer is capable to deliver it, but it does not meet your requirements or it does not fit the local conditions (technically, financially, institutionally etc.).

Option 3: you are satisfied that that the proposal sets out a proposition that is realistic, affordable and achievable and that the company or consortium is valid, capable and appropriate.

In case Option 1 or Option 2 are valid, either you should stop the discussions with the proposers or ask them a different set of proposals.

In case Option 3 is valid, then progress from hereon will be focused upon very detailed legal, environmental, economic and social assessment. At this stage, you may want to consider appointing external, independent experts to help further assess the proposal and provide impartial advice and assistance as you progress. Even credible companies can sometimes skew proposals that favour them rather than you and having access to an external expert can help to ensure that the balance is appropriate. Although this will require allocation of budget, compared to the overall project spend, it is proportionally very small yet could be a critical factor to ensure a successful outcome, saving the municipality millions of dollars in the long run.

