Annex 1
08 July, 2019

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS of REFERENCE (ToR)

REQUEST FOR PROPOSALS (RFP) – Design modification of Salt Production Technology for using solid biofuels

under the Framework of UNIDO/GEF-5 Project:
"Reducing Greenhouse Gas Emission in Industrial Sector through Pelletization Technology in Lao PDR"
(SAP ID: 140057)

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1. Background Information

The United Nations Industrial Development Organization (UNIDO) is implementing a Global Environment Facility (GEF) funded project entitled "Reducing Greenhouse Gas Emission in Industrial Sector through Pelletization Technology in Lao PDR" in collaboration with the Ministry of Industry and Commerce (MoIH) and the Ministry of Science and Technology (MoST) Lao PDR. The goal of the project is to promote the production and usage of industrial grade solid bio-fuel (pellets) for replacing coal and wood. In this way the project intends to reduce coal and unsustainably harvested fuelwood consumption and promote waste-to-energy methods. Thus, the project also aims to contribute to the sustainable energy practices in Lao, to enhance national energy security, to promote job creation and to reduce carbon dioxide emissions as well as avoid deforestation. The project will employ a two-pronged strategy of removing technological barriers for both producers and end users on one hand, and improving policies to expedite investments in the production and use of solid biofuels. This will be done through building necessary human and institutional capacities at all levels. Currently, salt is produced with a traditional technology of evaporating brine in a flat pan using coal, wood logs and sawdust as fuel. The project aims to replace traditional fuels with solid biofuel pellets/ briquettes. However, it had been found that the current open furnaces/ pan which has enormous heat losses and cannot directly use solid biofuel pellets/ briquettes efficiently. In this context**, expert services are sought to evaluate the current system of salt manufacturing and come up with an innovative and efficient system which will use biomass pellets and briquettes efficiently and effectively.**

2. Aim of the Terms of Reference

The selected bidder will be responsible for **designing an efficient and effective system, produce a prototype, demonstrate at site and monitor the results over at least 1 month.**

This Request for Proposal (RFP) is issued to receive proposals from interested innovative companies or consortiums, academic or research institutes. Proposal to be submitted must comply with the following overall **eligibility criteria**.

1. **The Salt Production Technology using solid biofuel pellets/ briquettes** has to:
    a. **Reduce GHG emissions**: suggested technology must have GHG emission reduction potential compared to the existing scenario by replacing fossil fuels (and improving efficiency) in salt factories in Lao PDR.
    b. **Be effective:** Allow production of salt at a quality comparable to the quality produced with the traditional stoves.
    c. **Be replicable** in other salt factories in Lao PDR
    d. **Be affordable**: Be economically viable, efficient and effective.
    e. **Be sustainable**: The technology shall avoid negative impacts on all dimensions of sustainability: social, environmental and economic.

f. **Be reliable:** Be easy to operate and maintain. The design, the quality of equipment, construction or installation and the operation (maintenance) of the system must ensure a reasonable life time.
g. **Use available feedstock**: pellets/briquettes from feedstock such as wood residues and crop residues (eg. rice mills), i.e. waste from agro-processing facilities and industries in Lao PDR.

2. **Target audience:** This RFP is open to private and public entities, research organizations, NGOs, Universities, etc.

3. Proposal

Interested parties, that satisfy the above requirements, should submit their proposals in line with attached **Annex 1 – UNIDO Template for submission of proposals**, **Annex 2 – Scope of Work and Services**, **Annex 3 – Description of the current salt production technology**, and **Annex 4 – Pilot on Jacketed Steam boiler** by **15 August 2019**.

Documents should be provided in English. Services proposed shall be reviewed and evaluated based on completeness and compliance of the proposal and responsiveness with the requirements of the ToR and all other annexes. Any offer that does not meet the requirements shall be rejected. Please also see UNIDO model contract and annexes on the UNIDO e-procurement portal for additional information.

Questions and your response should be sent to UNIDO by email to: A.Orlov@unido.org and to A.Eruwa@unido.org.

The complete RFP can be viewed on UNIDO e-procurement portal and your RFP uploaded on the same UNIDO e-procurement portal (https://procurement.unido.org/) or sent to the above email or by post and marked addressed as follows:

United Nations Industrial Development Organization (UNIDO)
Procurement Services Division/OSS/ (Attn. Mr. A. Orlov)
Wagramerstrasse 5, P.O Box 300, A-1400 Vienna, Austria
UNIDO Project No: 140057 –Design modification of Salt Production Technology for using solid biofuels in Lao PDR

UNIDO reserves the right to pre-qualify interested companies/institutions. Only shortlisted firms will be invited for further consideration.

4. Evaluation Criteria and Qualification Requirements

The bidder is expected to have:

- A minimum of 5 (five) years of professional experience in the field of thermal energy, biomass fuels and combustion/burning systems and operation;
- The managerial and the technical capability to design, develop, implement and monitor a pilot-project.
- Specific experience in salt industries would be an advantage;
- Experience in the region would be an asset.
- Understanding of the traditional salt cooking in Laos would be an asset.
- English language capability (proven records and/or certificates of company employees).

Proposals submitted will be evaluated against the following criteria:

- Proposed methodology, expected outputs, timeline, and work plan
- Experience in pellet utilization, technology development and implementation
- Profile, experience and qualification of personnel assigned to the contract/project
    - Education background and academic degree

- Expertise, competence and years of relevant working experience
- Previous experience in similar programmes or projects
- A team that comprises both women and men, as well as gender awareness of the team members would be an asset.

Annex 1: TEMPLATE FOR SUBMISSION OF PROPOSAL(S)

This Form can be completed electronically by pressing the 'Tab' key or clicking with your mouse on the grey text boxes and check boxes, or in hardcopy. Please note that fields marked with and * are mandatory.

PART 1: APPLICANT PROFILE

1.1 Contact details of Applicant:		
Name of Applicant*		
Type of Applicant*	**What is your organization's mission (Business nature)? Please provide a brief description or company profile of the lead company(ies)/institution(s), including organizational structure;** - Private, public or public-private company - Individual project bidder (registered as company) - Governmental institution (e.g. ministry, utility, electrification agency, municipality) NGO or cooperative	
Experience of the applicant	Please provide a brief description of relevant experience, if any;	
Address*		
Contact person*		Position*
Telephone number*		Mobile no
Email address*		Web site
Fax		
Name of partner organization/s (if any)		Type of Partner Organisation
Address of partner organization		

1.2 Experience / expertise of project team:
Highlight experience / expertise of relevance to the proposed project (detailed CV must be included as annexes)

Project team	**Name of Expert(s)**	**Role of Expert for the project**	**Relevant Experience and Education**
Lead applicant*			
Lead applicant			
Partner 1			

PART 2: INFORMATION ON THE SUGGESTED SALT PRODUCTION TECHNOLOGY

2.1 Technical Information (please attach detailed description or pre-feasibility study, if available)	
(Pre)-feasibility study/ assessment available (please attach)*:	(yes/ no) if yes, please attach; if no, please elaborate why it has not been conducted
Solid biofuel used*	(pellets/ briquettes/ both) Feedstock: (sawdust, rice husk, etc.)
Briefly describe the suggested technology/ innovation for salt production using solid biofuel (pellets or briquettes)	

2. 3 Summary of key features and main project concept:	
Social Impact*	(Please describe the expected social impacts, e.g. how will the salt production change the involvement of both women and men in the production process? For instance, describe the main target groups directly involved or concerned during project implementation and how their work model will be changed through the suggested technology.)
Environmental Impact*	(Please describe the expected environmental impacts)
Economic Impact*	(Please describe the expected economic dimensions, e.g. cost of the system, cost for salt production)
Briefly describe key activities that will be undertaken to design and implement the technology solution*.	
2.4 Any further comments	

PART 3: FINANCIAL INFORMATION

Provide a rough indication of the planned budget breakdown of the total direct project costs and funding structure as indicated in the example below. If relevant give a realistic overview on the co-funding from different partners.

Budget for the pilot technology (UNIDO/GEF Grant and Co-Funding)*					
Budget Items	**Comment**	**USD**	**LAK**	**Co-funding of the bidder (in-kind and cash)**	**GEF/UNIDO co-funding in %**
A. Personnel Costs					
B. Transportation					
C. Equipment and Supplies (see separate table on BILLS OF QUANTITIES OF THE EQUIPMENT AND SUPPLIES)					
D. Services					
E. Workshops and Training					
F. Other Costs					
G. Evaluation & Audit					
H. Contingency Reserve (5%)					
Subtotal Direct Eligible Costs					
Admin. Costs (max. 10%)					
Total Costs*					

BILLS OF QUANTITIES OF THE EQUIPMENT AND SUPPLIES[1]

[1]The bill of quantities indicates the major items expected for the desired system. Other miscellaneous and minor items are foreseen and will depend on the manufacturer of the equipment. Performance characteristics of all major equipment must be provided as an annex.

Item No.	**Description**	Unit	Qty	Unit Price	Price (US$)
1	Item 1	Nos.			
2	Item 2	Nos.			
3	Item 3	Nos.			
	.....				
	Total Cost	Nos			

Simple expected payback period for commercial application*:	years	Explanation on financial calculation*	

Part 4: Required Attachments:

- A (detailed) technical drawing of the suggested technology.
- Gantt chart to show implementation plan.
- A copy of the original registration document of the company/or institutions forming the consortium clearly describing the members, roles and the lead firm.
- (Pre)-Feasibility study report of the proposed technology, at least pre-feasibility study must be available

PART 5: CERTIFICATION BY LEAD APPLICANT

Signature:	
Name:	
Position in organization:	
Date and Location:	

Organizational Stamp of Lead Applicant:

Disclaimer:

REQUEST FOR PROPOSALs (RFP) do not constitute a solicitation. UNIDO reserves the right to change or cancel the requirement at any time during the REQUEST FOR PROPOSAL (RFP)and/or solicitation process.

Nothing in or relating to this REQUEST FOR PROPOSAL (RFP) shall be deemed a waiver, express or implied, of any of the privileges and immunities of UNIDO.

ANNEX 2 SCOPE SUPPLY AND SERVICES

The Scope of Supply and Works – Equipment and Technical Services

The project bidder is expected to provide expert services to evaluate the current system of salt manufacturing and come up with an innovative and efficient system which will use biomass pellets and briquettes efficiently and effectively. The bidder shall design an efficient and effective system, produce a prototype, demonstrate at site and monitor the results over at least 1 month. This includes procure, transport to the project site, install and commission the prototype for salt production using solid biofuel. The scope of works and supply includes the following:

- evaluate the current system of salt manufacturing
- complete technical design of the system,
- construction, procurement, and shipment of the selected equipment (if applicable),
- installation,
- grid connection (if applicable),
- commissioning,
- training on operation and maintenance for the plant operator,
- testing,
- adjustments (if applicable),
- monitoring, and
- documentation.

The technology designed must use solid biomass pellet or briquette from available agro-pastoral sector in Lao PDR (e.g. rice husk) and the construction shall be finished by December 2019.

The Bidder shall specify the capacity of the technology to be installed in the proposed project. The Bidder is obliged to provide UNIDO with the performance characteristics of all major equipment to be supplied as part of the project. UNIDO reserves the right to request more information on the performance of the equipment being proposed. In addition, UNIDO reserves the right to request the names of the suppliers of the different equipment. As part of the full proposal, the Bidder must provide a detailed bill of quantities showing all the costs of the project.

UNIDO might facilitate with customs clearance upon request. All payments related to custom clearance will be covered by the Bidder.

1. The bidder's responsibility/ Deliverables

The Bidder will be responsible for undertaking all work related to identifying the supplier of equipment, ordering and delivery of equipment including installation thereof. UNIDO project support is performance based where disbursement of the funds will be made based on the agreed milestones of the project implementation and on verification by UNIDO Project Manager or an expert designated by UNIDO.

The bidder is committed to provide the following:

- All technical staff and local labor including any consultants as required;
- Provision of materials, utilities, services, manpower, civil works (design and overseeing the execution), etc. related to installation, commissioning, start up, and testing;
- To establish a technology to produce salt replacing fossil fuels with solid biomass pellet or briquette (e.g. rice husk) in Lao PDR (see Chapter 2: Deliverables);
- To cover all other expenses required but not included in this TOR; such as all materials, utilities, services, manpower, civil works, etc. related to installation, start up, trial runs and testing;
- Include 2 tons of pellets[2] (pellet and transportation) that are suitable for testing the pilot and required for the pilot system to run at least 240 hours.
- Test both rice husk pellets and wood/ sawdust pellets.

[2] Probably one big bag of saw dust pellets can be purchased in Lao from Xayabouly province.

- The bidder shall grant full access to the technical knowledge to UNIDO, the salt factories and other stakeholders, including the Biomass Technology, Learning and Information Center (BTILC) in Lao PDR supported by UNIDO.
- The bidder shall ensure that sufficient staff and local experts are trained to design, install, operate, maintain and troubleshoot the system.

UNIDO will provide:

- Collaboration with a salt factory that will provide space (including location and building permits, necessary clearances including land use rights, environmental compliance certificate from respective regulatory authorities), general civil work (e.g. all materials, utilities, services, foundation, housing), electricity as well as brine required for the pilot system to run at least 240 hours.

The objective of the work under this RFP is the installation of a system for salt production using solid biofuel pellet/ briquette in Lao PDR including capacity building and documentation (transfer of technology for replication). The suggested technology has to:

1. **Reduce GHG emissions**: suggested technology must have GHG emission reduction potential compared to the existing scenario by replacing fossil fuels (and improving efficiency) in salt factories in Lao PDR.
2. **Be effective:** Allow production of salt at a quality comparable to the quality produced with the traditional stoves.
3. **Be replicable** in other salt factories in Lao PDRT
4. **Be affordable**: Be economically viable, efficient and effective.
5. **Be sustainable**: The technology shall avoid negative impacts on all dimensions of sustainability: social, environmental and economic.
6. **Be reliable:** Be easy to operate and maintain. The design, the quality of equipment, construction or installation and the operation (maintenance) of the system must ensure a reasonable life time.
7. **Use available feedstock**: pellets/briquettes from feedstock such as wood residues and crop residues (eg. rice mills), i.e. waste from agro-processing facilities and industries in Lao PDR.

The system for salt production using solid biofuel pellet/ briquette could be a type of furnace or burner consisting of a modified furnace system with pellet feeder or burner with feeder or a gasification system with gas piping, valve, burner etc. Specification of the pellet/ briquette furnace could include the following:

	Item	Specification
1	Furnace made of refractory and parts	tbd
2	Pellet feeder (semi-automatic with motor)	tbd
3	Pellet burner (optional)	tbd
4	Gasifier (optional) responsible for at least 10 kettles.	tbd
5	Piping system (optional in case of go for gasifier system)	tbd
6	Uniform gas burner (optional in case of go for gasifier system)	tbd
7	Required temperature of furnace	550-650 degree Celsius
8	Required temperature of boiling	100-105 degree Celsius
9	Frequency of hopper filling	1-2 hours

In addition, Bidder is required to ensure:

- GHG emissions savings;
- socio-economic benefits;
- no harm is done to the environment (e.g. emissions, waste).

- compliance with national standards e.g. emission standards.

The Bidder shall ensure that the pilot system will run optimally and allow UNIDO to:

- to test the functioning of the technology (the salt factory will provide land space and material for building the furnace, material for making the kettle, electricity for installation and running the motor and necessary equipment as well as brine.);
- to test the salt quality resulting from the suggested technology;
- make amendments at the testing facility if requested to optimize the functioning and salt quality;
- gain trust that the suggested technology will benefit the overall project goal "To reduce GHG emission in Lao PDR's industries by promoting the production and usage of industrial grade solid biofuel for thermal energy generation".

All documents will be provided with 1 electronic copy each to UNIDO HQ and UNIDO Cambodia, consisting of the following electronic files:

- PDF file
- Original work files (WORD, POWER POINT, EXCEL, etc.).
- Photographs

The electronic copy can be provided via e-mail, if the nature and size of the files make it possible. Otherwise, the electronic copy will be provided in a CD or DVD copy. All deliverables and related documents shall be provided in English.

2. Performance Standards

For the equipment to be procured the Bidder has to guarantee the fulfillment and quality of all the work as specified in this TOR. The Bidder guarantees that engineering design, specifications, technical documentation and other documents, which are the basis for the plant, are in accordance with the project objective. The project has to be in line with the best available technology (Reference document: IFC and BMF, Converting Biomass to Energy: A Guide for Developers and Contractors, 2017[3]).

The Bidder guarantees that the machinery, equipment and all other technical components will be new, of recent conception, without any defect or malfunction, and that the time for the technical guarantee will be at least 6 months for all parts, starting from the take-over.

3. Delivery Period

Within five (5) months after signing of contract with UNIDO

4. Time Schedule

A time schedule for the implementation should be provided in form of detailed Gantt chart including delivery, start up and training of personnel, as may be required. Delivery of the equipment to the project site should be within 5 months after the date of signature of the contract.

Sub-Contract Task	Aug	Sep	Oct	Nov	Dec	Deliverables/ Outputs	Payment
Subcontract : Detail-furnace/burner design for using pellet for salt evapoartion							
Preparation of pilot test system (engineering design and procurement of pellet)						1st Progress Report	1st Payment
Capacity Building							
Civil work and Installation of the system						2nd Progress Report	2nd Payment

[3] https://www.ifc.org/wps/wcm/connect/7a1813bc-b6e8-4139-a7fc-cee8c5c61f64/BioMass_report_06+2017.pdf?MOD=AJPERES

Testing the system						3rd Progress Report	3rd Payment
Reporting						Final Report	4th Payment

5. Reporting

Progress reports shall be submitted to UNIDO in accordance with the provisional time schedule to be provided by the Bidder during the application. The reports shall be provided in English; the format and number of copies will be given in the contract.

a) **1st Progress report,**
   a. elaborated and updated work plan for the project execution
   b. engineering design

b) **2nd Progress report**, confirming progress of project (at the time of equipment delivery).
   a. detailed information and pictures of equipment at the work site

c) **3rd Progress report**, confirming progress of project (at the time of installation and test-run of equipment).
   a. detailed information and pictures of equipment at the work site, all local supplies, completion of civil works, installation and commissioning of the system at the work site
   b. certification of completion of the work duly signed by the project counterparts and UNIDO
   c. certificates/ reports of trial and test runs performed

d) **Final report,** upon completion of the works under the contract including commissioning and project documentation.
   a. training material and training reports,
   b. manual for replication,
   c. video recording detailing all activities undertaken from site preparation, mounting/ installation and commissioning of the system, training of local technicians, etc.
   d. certificates/ reports of trial and further test runs performed
   e. technical documentation of the equipment, installation and final detailed "as built drawings"
   f. lessons learned under the contract

All written material submitted shall be in English and should be of such quality that no additional technical editing is required. Documentation and reports shall be submitted to UNIDO in accordance with the provisional time schedule. The Bidder will also ensure the timely delivery of all required project deliverables.

The site supervisor of the Bidder will prepare progress reports based on inputs from the biogas system supplier including photographs and percentage progress of each subsystem which needs to be submitted to UNIDO upon request.

6. Payment schedule and conditions

The payment shall be made for the solid biomass system installed based on the following payment terms:

1st Payment	30%	After acceptance of the 1st Progress Report
2nd Payment	20%	After acceptance of the 2nd Progress Report
3rd Payment	10%	After acceptance of the 3rd Progress Report
4th Payment	30%	After acceptance of the Final Report

No price variation due to escalation, inflation, fluctuation in exchange rates, or any other market factors shall be accepted by UNIDO after it has received the Proposal.

7. Additional requirement

UNIDO general standards require that all work submitted to the Organization must comply with copyright law. Use of ICT resources or data in violation of applicable contracts, licensing agreements and copyright law is prohibited by UNIDO. Issues of copyright infringement would be taken very seriously by UNIDO and could result in a termination of services. Academic sources (journals, government documents, authorized publications, databases, etc.) are accepted for the purpose of conducting studies and analysis under contract with UNIDO.

8. Compliance with Laws and Regulations in Lao PDR and International Norms

The bidder must guarantee the quality of all the work as specified in this RFP. The bidder guarantees that engineering design, specifications, technical documentation and other documents, which are the basis of the proposed system, are in accordance with the project objective. The bidder must also guarantee that the machinery, equipment and all other technological components will be new, of recent conception, without any defect or malfunction, and that the time for the technical guarantee will be at least 6 months, starting from the date of the commissioning.

ANNEX 3 – Description of the current salt production technology

Current Salt Production Technology

The salt production in Laos use brine from underground. The brine is pumped from the underground, collected in a tank and distributed to the kettles and salt field via a tube. There are two ways of salt evaporation one is through natural sunlight and the other is through thermal energy. Thermal evaporation takes place in open kettles in Lao. The kettle is made of thick zinc galvanized plate with about 0.3- 0.35mm thick, size 0.8x2m or some factory in southern provinces made of steel plate of 2.0mm, size 1.8x9.2m. The thermal energy generated for the evaporation is from sawdust, fire wood and coal cake. The furnace is not very energy inefficient since it is open. The production area is dusty and smoky, so that it affects the quality of salt and health of workers. After cooking, the salt is dried by natural air. The dried salt is comes to iodization and packaging in later steps. Most of the salt is sold locally.

Furnaces are built, maintained and fired by communities and families that live around the salt factory or also on the salt factory land. Workers at the salt factory are farmer and work most of the time e.g. on rice fields and go fishing. They come to fire and fill up the kettles in the morning and come to collect the salt at lunch time and evening. Salt is usually fetched by women. The firing is about 1-3 times a day and usually done by men.

The production is a batch process: one batch takes 16 to 20 hours. The factory workers start early in the morning and finish late evening or start late evening and finish in the afternoon of the next day. The production is 160kg to 180kg in case of use sawdust and firewood, and 200 kg to 220 kg in case of coal cake for the small kettle and up to 450kg or even more for the big kettle in southern provinces. The surface temperature of the kettle is about 100 to 105 degree Celsius. The optimum temperature inside the furnace for best salt quality is about 550-650 degree Celsius. Higher temperatures will cause damage of the thin zinc galvanized plate and the salt quality.

The salt production is labor intensive, but also generates income for farmers about 4 to 8 million kip per month. The family is paid by the weight of the produced salt.

To allow for the export of salt (which is done currently only at one factory), an additional drying process is needed (currently done by greenhouse solar dryer with backup from electricity in the night time and lack of sunlight) to reduce the weight and improve the salt quality for export.

The pictures below show the way of how salt is produced traditionally in Laos.

In Lao PDR currently 8 factories produce salt using traditional technology. The UNIDO project has conducted energy audits of 6 salt factories operating in 2017 (please see Attachment). All of them produce salt traditionally in an open kettle (using firewood, coal or sawdust) for table salt and drying in open yard (using sunlight) for industry salt. This project aims to reduce GHG emissions and therefore promotes replacement of traditional fuels used in the production of table salt.

There is one salt factory in Oudomxay province, Namor village, which is Chinese owned with 100ton per day.

Annex 4: Pilot on Jacketed Steam boiler

In 2017, the UNIDO project had implemented a pilot using a jacketed steam boiler using pellets for salt evaporation at Veunkham salt factory. The pellet burner and the steam generation are fully automatic and equipped with a controller. The pellet is filled in a hopper and fed to the burner. The steam boiler runs at a working pressure of 2.0-2.5bar with a capacity of 150kg steam per hour. The steam generated is distributed to the jacketed steam vessel with working pressure at 1.5bar and required temperature at 105-110 degree Celsius.

The factory had conducted a test in August 2018 with the result as described in the text box bellow:

1. Before starting, all the procedure of checking water level, valve etc. had been done
2. Filled the pellet tank (silo) full with pellet, measure the width and length of the tank, 80cmx60.5cm
3. Start the boiler at 10:00am. The set pressure was at 2.5bar max and 2.0bar min
4. The set pressure 2.5bar reached at 11:00am (one hour operation), there was a measurement of the depth of the tank for the fuel use, it is 8cm.
5. When the pressure reached 2.5bar the brine cooking process started by open the steam valve to let the steam go to the vessel, which prepared with about 260 liter brine.. (Noted that the pressure dropped and the boiler started). The real cooking time is 3hr and 15min. stop at 2:15pm. The weight of the first batch was 75kg (with high moisture). The fuel use is 21cm.
6. The second batch started on 2:40, finished at 6:10 with total cooking time of 3hr and 30 min, the weight of the second batch is 85kg (with high moisture). The fuel use is 16cm. Brine was not measured. It was assumed that it is about 275l.
7. Shortly before the end of the cooking the boiler was shut down in normal condition until stop at 6:20pm
8. The total production of two batches is 75.4+85kg= 160.4kg (high moisture)

There was another attempt with continuous operation; by continue adding the brine without stop and restart till the end of the day, the result was a higher salt output.

Although the pilot showed good quality of the salt product in comparison to traditional cooking method there is no replication of the technology to date due to the following reasons:

- The operation of the boiler and the jacketed steam boiler need attention and skilled operators (that are currently not available at the salt factories)
- The factory is worried about the high investment cost of the system (the boiler and the jacketed steam boiler), which links to the longer payback period. However, if the factory could increase the export volume the investment could come to their consideration later.
- The system creates good working condition due to less heat and dust.

Photos: