ALUM 2019 INVESTMENT PROGRAM

In 2019, the Company remains committed to its sustainable and long-term development strategy, thus, ALUM SA Investment Program for the year 2019 includes investments which are absolutely necessary to:

- continue the energy efficiency improvement by optimization the combustion and heat transfer processes;
- increase competitiveness by installing new equipment that will allow to obtain new types of products;
- increase operation safety for steam and natural gas fired installations;
- ensure the plant operational continuity by extending the life of the mud pond and comply with the environmental permits stipulations.

Executive Summary:

ALUM's investment program for the year 2019 requires a total estimated budget of **8,301,000 USD** and comprises 14 investment projects,

US$'000

Company	*No. of investment projects*	*Necessary Capex 2019*
ALUM SA Tulcea	***14***	***8,301***

The 14 investment projects in the Investment Program of ALUM SA for 2019 are structured in three chapters as follows:

- **Chapter 1 - Projects previously approved and currently under implementation** – includes 7 investment projects with a forecast budget of **5,581,000 US$** necessary to complete the previously approved projects, which are currently under different stages of implementation, in order to benefit from the estimated results, including the non-refundable amount related to the last instalment of the project implemented under the Competitiveness Operational Programme 2014-2020;

- **Chapter 2 - Projects for ensuring the operating conditions and production process safe continuity (maintenance capex)** – includes 5 investment projects with a necessary forecast budget of **2,400,000 US$** necessary to continue the safe and efficient operation of the technological equipment;

- **Chapter 3 - New investment projects** - includes 2 investment projects with a necessary forecast budget of **320,000 US$,** necessary to start projects that will ensure the equipment and facilities necessary for the new ALUM products storage and delivery and the observance of Alum commitments in terms of energy efficiency improvement.

Financial effort of these investments will be assured both by internal financial resources and by loans, like leasing financing or credits.

Chapter 1 - Projects previously approved and currently under implementation

The investment projects included in this chapter have been approved in the previous years and are now under different stages of implementation, their completion being a priority in order to benefit from the following results:

- ensuring the red mud pumping under safe conditions from the plant to the red mud pond;
- reducing the natural gas specific consumption and compliance with the new limits required in terms of NOx emissions;
- increasing the operation reliability of static and dynamic equipment, necessary for performing ALUM departments activities;
- ensuring the operation continuity by complying with the requirements of ALUM's Integrated Environmental Authorization and ISU Fire Authorization;
- increasing ALUM competitiveness by producing and trading new types of products.

Project Code	Project denomination
D-064.17.SRR.01	**Red mud pipe, length 4.5 km (from the plant to the red mud pond)** This investment projects is scheduled to be completed in June 2019 and it will ensure the red mud pumping under safe conditions from the plant to the red mud pond.
D-076.18.CET.01	**Reduce the emissions and increase the energy efficiency by installing a low NOx combustion system at boiler no. 4** This investment project will ensure the reduction of NOx emissions related to boiler nr. 4 from 300 mg/Nm3 in the combustion fumes to 100 mg/Nm 3 in the combustion fumes as per the provisions of the Integrated Environmental Authorization, and it is scheduled to be completed in May 2019.
D-067.16.CET.01	**Combustion fume fan for Steam Boiler no. 2 (low NOx emissions)** This investment projects is scheduled to be completed in June 2019 and it will ensure the reduction of NOx emissions related to boiler nr. 2 from 300 mg/Nm3 in the combustion fumes to 100 mg/Nm 3 in the combustion fumes as per the provisions of the Integrated Environmental Authorization.
D-075.18.FAD.01	**Acquisition and installation of a disc filter for coarse seed** This investment projects will ensure the reduction of the slurry content in spent liquor from 5 g/l to a maximum of 1.5 g / l, and it is scheduled to be completed in October 2019.

Project Code	Project denomination
D-076.18.SRF.01	**Enhancing the security filtration process efficiency by acquiring and installing vertical filters** This investment projects is scheduled to be completed in June 2020 and it is necessary to be implemented in order to reduce the washing waters dilutions and thermal losses by installing new high efficiency automatic filters for pregnant liquor, which do not require manual filter media washing operations (improving ALUM product quality).
D-071.18.ALM.01 **D-066.18.ALM.01**	**Different acquisition (PPE, MCE, ENDOWMENTS) approved in 2018** This investment project is scheduled to be completed in June 2019 and it will ensure the increase of the heat recovery capacity, and provide the necessary equipment and spare parts for maintenance, thus supporting predictive maintenance and cost reduction programs.
D-059.16.ALM.01	**Increasing Alum competitiveness by installing equipment to obtain wet and dry hydrate:** **- Drying hydrate equipment;** **- Hydrate grinding and classifying equipment;** **- Wet hydrate classifying equipment.** The investment project is aimed at increasing Alum competitiveness by the production and trading of new types of value added product and the project implementation completion will ensure also the reimbursement of the last instalment related to the financing contract within the Competitiveness Operational Programme 2014-2020 (as per the schedule agreed with the Management Authority, the project is to be completed in March 2019).

Chapter 2 - Projects for ensuring the operating conditions and production process safe continuity (maintenance capex)

In order to ensure the safety and continuity of the technological processes in ALUM SA, the 2019 Investment Programme of ALUM S.A. comprises 5 (five) investment projects, whose implementation will provide the conditions required to achieve the budgeted production as well as the maintenance and safe continuity of the industrial equipment operation.

Project Code	Projects denomination
D-060.17.SRF.01	**Increasing the red mud pond storage capacity by increasing the height of the perimetral dykes** This investment projects is needed to continue the safe operation of the Red Mud Pond, while increasing its lifespan, and has a total estimated budget of $ 500,000 for the year 2019.
D-054.19.SAS.01	**Increasing recirculated water cooling system capacity of Precipitation**

Project Code	Projects denomination
	Installation This investment projects is scheduled to be completed in December 2019 and it is necessary to comply with BAT and ARBDD requirements. At the same time, this project will entail a reduction of the industrial water consumption by 23,400 m^3/month during the summer period, and by 11,700 m^3/month during the winter time.
D-071.19.ALM.01	**Investments for maintenance and improvement of equipment parameters - Alum (PPE) 2019** The total estimated budget for this investment project in 2019 is of $ 453 thousand and comprises mainly the acquisition and installation of: ➢ Plates and gaskets heat exchangers; ➢ Flocculant dosing pumps; ➢ Gear boxes, pumps, compressors, valves.
D-066.19.ALM.01	**Replace the obsolete equipment (Endowments) 2019** The total forecast budget for this investment project in 2019 is of US$ 447 thousand and comprises mainly the purchase, installation and commissioning of: ➢ One wet hydrate packing system; ➢ One flocculant dosing station with 4 pumps for tanks 312-304; ➢ One 8 t crane for the hydrate storage area;
D-070.16.ALM.01	**Maintenance Capex (Digestion upgrading - autoclave registers and stirrers for 1 Digestion and Evaporation battery)** The implementation of this investment project is necessary in order to observe the 2019 Repair Programme of ALUM SA, which will provide the premises for the equipment safe operation at the designed technical parameters, as well as in order not to disturb the technological flow due to unplanned shutdowns.

Chapter 3 - New investments projects

ALUM S.A. 2019 Investment Programme comprises in this chapter 2 (two) investment projects, which are aimed at providing the equipment and facilities required for the storage and delivery of new products from ALUM SA as well as for observing Alum SA commitments in terms of energy efficiency improvement.

Project Code	Projects denomination
D-078.19.ALM.01	**Packaging, storage and distribution of new Alum products** This investment project is scheduled to be completed by September 2019 and it is required to provide the equipment and facilities needed to preserve, store and deliver new products from ALUM.
D-058.16.SRL.01	**Optimize the steam lines and installing steam traps in 1 Digestion battery / steam pressure reduction station** This investment project is scheduled to be completed by December 2019 and it is necessary to comply with ANRE provisions. Following the implementation of this projects natural gas savings of about 1 million cubic meters per year are estimated to be achieved.

Conclusions

In the year 2019, the total value necessary for implementing ALUM's Investment Programme amounts to **8,301,000 USD** and it is structured as follows:

- 5,581,000 US$ necessary to complete the previously approved projects, which are currently under different stages of implementation and are necessary in order to benefit from the estimated results, including the non-refundable amount related to the last instalment of the project implemented under the Competitiveness Operational Programme 2014-2020 (7 projects)

- 2,400,000 US$ necessary to provide the operating conditions and safe continuity of the technological equipment operation - Maintenance Capex (5 projects)

- 320,000 US$ necessary for starting new projects which will provide the equipment and facilities required for the new ALUM products storage and delivery and will entail the observance of Alum commitments in terms of energy efficiency improvement

The Board of Directors of ALUM SA endorsed the Investment Programme of ALUM S.A. for the year 2019 and hereby propose that the company's shareholders approve the implementation of the above Investment Programme of ALUM S.A.

President of the ALUM SA Board of Directors
PhD. Eng. Gheorghe Dobra

08.03.2019