Advanced technology for pretreatment of municipal wastewater sludge to improve biogas generation and decrease of dry sludge

Summary

Profile type
Technology offer

Company's country
Switzerland

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Profile status
PUBLISHED

Type of partnership
Investment agreement
Commercial agreement with technical assistance

Targeted countries
• World

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General Information

Short summary

A Swiss SME active in environmental technologies offers a solution for sludge pretreatment in municipal wastewater plants. The solution (technology and machinery) can pre-treat sludge before the digester and by this significantly increase biogas generation (up to 50%) and decrease dry sludge disposal at the end of the process (up to 20%). The dry sludge could be used as fertilizer. The company searches for license, joint venture, commercial or technological cooperation agreements.

Full description

Sewage is treated in wastewater treatment plants to recover usable water streams. The semisolid or solid by-product formed during sewage processing is known as sludge. Treatment of sludge is chiefly designed for reducing the sludge volume and converting the organic materials in the sludge into stable substances to enable effective disposal, recover a usable product, or generate biogas. The main processes to achieve these goals are sludge digestion, in which organic matter is biologically decomposed under the action of bacteria, and secondary sludge dewatering, in which water is removed from the sludge.

The company's solution is solving the problems associated with sludge digestion and the generation of biogas and sludge dewatering. One of the main challenges in treating sludge is that not all the organic material is available to the bacteria. That's why the biogas generation is still limited. Only 50% of the biogas potential is currently generated in

wastewater plants. The second significant challenge of the process is a high concentration of water trapped inside the dry sludgy (up to 90%) at the end of the process. That's why sludge (mechanical or thermal) dewatering is a critical stage before dry sludge can leave the wastewater plant. However, efficient dewatering by conventional mechanical methods is challenging to achieve.

The Swiss company offers a solution called sludge pretreatment and partial oxidation process (STP). It is a fully automatic, in-situ, partial chemical oxidation unit for the pretreatment of primary and secondary municipal sludge before digestion. The technology increases the soluble chemical oxygen demand (sCOD) levels before anaerobic digestion (AD) by up to 100% through partial oxidation of sludge. Sludge from clarifiers is pumped to the STP unit, where it is sprayed with an active solution consisting of two stable materials. The materials react to generate superoxide radicals, which partially oxidize the sludge, increasing the sCOD concentration. Under normal temperature and pressure, the average reaction time is one hour, during which mechanical agitators continuously mix the sludge. At the end of the process, the oxidized sludge is pumped to the digester, where the increased sCOD concentration increases the availability of the organic material to the bacteria. This process increases biogas yields by up to 50%, reduces sludge disposal volumes by up to 20%, and improves the secondary dewatering process. Moreover, the sludge could be used as fertilizer at the end of the process (sludge class A). This unique approach not only improves existing processes, increases biogas generation, and saves operational expenditures (OPEX) to wastewater plant operators but also decreases the carbon footprint of the wastewater plant.

The technology can be applied in any wastewater facility (centralized and non-centralized plants). However, the technology is especially efficient in wastewater plants with biogas generation units.

The company searches for partners/representatives active in the wastewater sector, wastewater plants operators and designers (engineering offices), environmental engineering offices, recycling companies, waste management companies, and companies in the field of biogas generation from waste and wastewater for license, joint venture, commercial or technological cooperation agreement.

Advantages and innovations

- It can be easily installed in any size wastewater facility
- Plug and play containerized solution
- Rapid pretreatment
- Fully automatic machine
- Increase in soluble organic material (sCOD) up to 100%
- Increase in biogas generation up to 50%
- Decrease in dry sludge disposal up to 20%
- Cost-effective (savings in dry sludge disposal and profit in additional biogas generation)
- The sludge at the end of the process can be classified as sludge class A (fertilizer)
- Small footprint of equipment
- Very low electricity requirement
- Save for users and the environment
- Negligible CO2 footprint (decrease CO2 footprint of the facility)
- Low capital expenditure (CAPEX)
- Fast return on investment (ROI in less than one year)
- Improve dewatering
- Granted patents
- High availability of active solutions in all the territories

Technical specification or expertise sought

Stage of development

Available for demonstration

IPR Status

IPR granted

Sustainable Development goals

- **Goal 6: Clean Water and Sanitation**
- **Goal 7: Affordable and Clean Energy**

Partner Sought

Expected role of the partner

The specific area of activity of the partner:
The Swiss company is looking for companies active in wastewater sector, wastewater plants operators and designers (engineering offices), environmental engineering offices, recycling companies, waste management companies and companies in the field of biogas generation from waste and wastewater.

The tasks to be performed by the partner sought:
The Swiss company provides the technology (patents, design of machines and know-how) and machine

manufacturing (if it is required) to the partner, who is responsible for marketing, sales and project execution, local permitting and administration. The partner is provided with trainings and support from the Swiss engineers if required.

The key component of the technology stays as the property of the Swiss company. The partnership can take many forms notably a license or join venture or commercial agreement with technical assistance. Further collaboration such as technical cooperation agreements could also be envisaged later.

- License and joint venture agreements: the Swiss company is a knowledge company and is not executing the projects. Therefore they are looking for companies that have an execution ability and manpower. License and joint venture agreements allow the Swiss company to operate in different countries on high capacity projects without developing their own capacity for project execution in each country. For a long term any of their licensees will still need the supervision and support of the Swiss company in the design of the project.

- Commercial agreement with technical assistance: as a knowledge company that sees in their competitors also a potential customer a commercial agreement with technical support allows the Swiss company to develop new units based on their oxidation processes to existing facilities. This kind of cooperation can open them a new market (“retrofit”). It will allow them to work abroad based on the existing facilities of the partners.

- Technological cooperation agreement: this will allow the Swiss company to develop and upgrade their technologies based on the added value knowledge of the sought partner and will save them time and money during market penetration. At the end of the process and with a generation of joint know-how they can sign a joint venture agreement and implement their processes in the global market.

Type of partnership

Investment agreement

Commercial agreement with technical assistance

Type and size of the partner

- **Big company**
- **SME 11-49**
- **Other**
- **SME 50 - 249**

Dissemination

Technology keywords

- **10004006 - Sludge Treatment / Disposal**
- **04006 - Biogas and anaerobic digestion (AD)**
- **10004002 - Municipal Water Treatment**
- **04005009 - Energy from wastewater**

Market keywords

- **08002001 - Energy management**
- **09008002 - Water, sewerage, chemical and solid waste treatment plants**
- **09003001 - Engineering services**
- **08004003 - Water treatment equipment and waste disposal systems**
- **08004004 - Other pollution and recycling related**

Targeted countries

- **World**

Sector groups involved