

1. Entity posing the challenge

- AGALEUS, INDUMETAL RECYCLING, ZABALGARBI

2. Challenge statement

Prevention and management of emergency situations

3. General context

Aclima is a pioneering cluster founded in 1995 and a benchmark in the Basque environmental sector. It represents companies, public entities, agents of the Basque Science, Technology, and Innovation Network, associations, and university training centres related to the waste, soil, integral water cycle, climate change, biodiversity and ecosystem value chains. The main objective of the cluster is to support companies in the sector to improve their competitiveness by identifying and characterising new business opportunities, innovation, and international positioning, always based on cooperation.

Aclima's current 2019- 2022 strategic plan has 3 strategic areas: climate change, environmental quality, and the circular economy as the driving forces behind the activities promoted by the cluster and 5 areas of opportunity. This includes the Basque Environment 4.0 initiative, one of the lines of action with which it aims to support the integration of 4.0 technologies in the Basque environmental sector value chains, either by developing new advanced products and services, or by facilitating process improvement.

In this context, being able to take advantage of the opportunities that the Industry 4.0 approach poses for the sector is crucial. It is also a strategic commitment of the Basque institutions in which the Eco-industry sector plays an active role as a key agent in the twin (green and digital) transition promoted by the European Green New Deal. The application of 4.0 technologies is already making it possible to generate new value proposals and it is expected to play a key role in strengthening the technological and business capacities of the Basque environmental sector as a whole. With this vision, Aclima has recently formed the Waste 4.0 working group. This group is made up of waste managers who have industrial plants and are interested in tackling the challenge of Industry 4.0 collaboratively and with a value chain approach. With this precedent, the BIND 4.0 SME Connection programme presents itself as an excellent opportunity to address this challenge in a collaborative format of open innovation with Start-ups.

In this context, and in order to better understand the challenges that will be set out below, it is essential to emphasise that companies posing the challenge belong to the integrated waste management value chain. This value chain is made up of a large number of operators that offer all kinds of environmental solutions for Minimisation, Reuse, Recycling, Management, Energy Recovery and final waste disposal activities. It is also important to note that these companies

have extensive experience ranging from logistics services to recycling processes at their treatment plants. While it is true that there is a considerable difference in the production processes of the companies posing the challenge, it should be noted that they also share certain similarities in the internal operations of their treatment plants, regardless of the waste treated. This implies that they share common industrial processes such as waste weighbridges, storage, laboratory testing, etc.

Some challenges have been detected after identifying these common processes and with the desire and spirit to continuously improve the sector and the cluster itself, as well as in a bid to improve sustainability. Resolving these challenges is intended to increase efficiency and the levels of digitalisation of the companies defining the challenges.

4. The Challenge

1. Expected technological solutions

Both hazardous and non-hazardous waste management companies must have exhaustive knowledge on the potential risks their activities face. In this case, effective information management is essential to preventing the associated risks.

These processes are controlled to the maximum extent possible and companies invest heavily in occupational health and safety prevention. Nevertheless, digitalisation could be an important ally to continuously improve plant safety as a greater volume of information can be analysed automatically. This could be used to establish a decision-making criterion that is updated at all times and is appropriate for each type of waste. This could apply to risk prevention and minimisation, but also to establish the best way to act in the event of a fire.

On the other hand, although the companies in the sector have implemented incident response plans, it is important to continue to improve emergency training for staff, and the availability of data to prevent such events can be particularly useful.

2. Main questions to be solved

The measurement of hazard-related parameters (air composition, density, temperature, etc.) using sensors or digital technologies can be a step forward for predictive and preventive action in response to possible accidents, although these systems must be optimised to minimise the generation of false alarms.

In addition, in-plant data collection can help workers to be trained on how to interpret critical values associated with the waste in order to anticipate possible emergencies.

3. Main impacts

- Would it be possible to parameterise regular waste storage deposit values to identify anomalies and generate warnings?
- Can sensors be used to predict emergency situations in "dirty" and/or hostile environments in terms of fluid hazards?
- Would it be possible to achieve "0 false alarms"?

4. Description of the challenge:

The technological solutions expected to address the above challenges are:

- The inclusion of sensors and measurement systems to parameterise fluids, gases, temperatures, and other dimensions that could prevent possible plant incidents.