Life Optimelt

Air Emissions Reduction and Energy Efficiency Improvements with OPTIMELT™ Technology

LIFE15 CCM/NL/000121 – LIFE OPTIMELT
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To boldly go where no glassmaker has gone before!

--- Frank Schuurmans
Director of Glass & Furnace Technology Libbey

LIFET5.CCM/NL/000121 - LIFE OPTIMELT at Libbey Leerdam
(The Netherlands)
Introduction

The Paris Agreement has triggered efforts to tackle climate change, with the long-term goal of keeping the increase in global average temperature at well below 2°C above pre-industrial levels.

In this context, Energy-Intensive Industries (EII) play a critical role in achieving this objective, as they were responsible for about 24% of global CO2 emissions in 2014.

However, the financial and competitiveness cost for switching to new industrial processes requires significant upfront investment with no guarantees of return.

This project demonstrates a groundbreaking technological solution that enables several high temperature manufacturing industries to cut down Green House Gases (GHG) emissions significantly and additionally improve air quality, which fit with the scope of LIFE funding programs, EU climate mitigation priorities and the EU policies for Energy Intensive Industries.

**LIFE15 CCM/NL/000121 LIFE OPTIMELT**

**Project contributes to:**

- The EU goals of cutting GHG emissions at least 40% below 1990 levels.

- Closely link the local economy and population (about 40% of 200 employees live in Leerdam) to this EU goal.

- Improve the air quality in the city of Leerdam and the close Nature 2000 site.

- Boost regional economy for several years, deepen the knowledge and skills of the employees and secure long term employment.
Working in Partnerships to Consume Less Energy

In the past few years, the European Union has put in place a series of legislative measures to help decouple industrial production from CO₂ emissions, notably the directives on energy efficiency, energy performance and the 2050 Low Carbon Road Map.

Through the LIFE Program the EU has set up a financial instrument that also facilitates the development of low-carbon technologies, the uptake of Best Available Techniques and the demonstration of good practices in the energy-intensive sector.

The LIFE OPTIMELT Project contains the demonstration of an innovative waste heat recovery concept. The technology is called OPTIMELT™ and is able to use waste heat from high temperatures generated during the manufacturing process.

Libbey’s Glass Manufacturing Plant at Leerdam is in compliance with the different permits and regulations in the Netherlands and Europe. However, faced with the coming challenges related to energy and climate change, in addition to being competitive in a tough industry, Libbey continuously needs to improve their process to lower production costs.

OPTIMELT™ Technology will provide Libbey with groundbreaking techniques to manufacture glass using less energy, and emitting less CO₂ and NOx.

Project objectives:

- Reduction of CO₂ emissions per year, participating in the EU priorities.
- Reduction of NOx emissions per year, improving the air quality of the area including a Natura 2000 zone.

Less energy used in the process, maintaining the same quality in the final products.

The OPTIMELT™ Project has lead to the reduction in energy consumption and air emissions at Libbey Leerdam (considering the implementation of oxy-fuel+ OPTIMELT™ Technology).
The location of LIFE 15 CCM/ NL/000121 LIFE OPTIMELT Project
Planning

Good planning from the start will guarantee that the appropriate funds and skills are available at each stage of the project.

By taking into account the location, funding, and skills available at each phase of the project, its success is made possible.

Funding:

Drawing up a funding strategy from the start, considering the short, medium and long term, is a must.

The project’s partnerships invest close to 9 million € on the project. The partners are supported by LIFE, which provides 2.3 millions €.

A joined-up approach where the partners work together throughout the project helps to develop new technologies and to set jobs that require a high level of knowledge.

Choosing partnerships and technology:

Depending on your objectives, there are various ways of selecting your partnerships. Make sure you understand the character and culture of your counterpart.

Choose partners that are capable of providing the project with the most innovative technology and, also, with the necessary robustness.

The furnace has to be operational 24 hours a day, 7 days a week and 365 days a year, 24/7/365 for the next 15 years.

Skills:

A core team ensures continuity and recognizes the importance of external expertise, such as adequate engineering capabilities, economic expertise and knowledge on emissions.

The expertise of local workers will skyrocket under the stimulus of new ideas, on ways of working and assigning the best available practices.
Implementing

This is the practical work that will ensure the success in the development of the entire project by the implementation of OPTIMELO™ Technology.

Professor Jan Rotmans challenged the team to “go beyond our ambition of reducing emissions and leave a better planet for our children” during the Furnace L1 Official Opening Event ceremony.

Project details:
- Duration: 15th July 2016 to 15th April 2020
- Budget: 8,284,751€
- Funding: 2,275,538€
- Companies’ contribution: 6,009,213€

Working at different scales:
International teams working for the same project provide a transversal overview that improves the final objective.

Teams based in The Netherlands, Belgium, Germany, Spain, USA, Portugal... contributed to the successful implementation of a disruptive technology.

Big Multinationals, together with local/regional companies, contributed to making the project possible.

The people of Leerdam have been closely informed about the project’s implementation.

Environmental authorities have been informed and have issued the necessary environmental permissions.

Professor Rotmans discussing about Energy Transition
Engaging

Engaging in good quality is important. A broader public, European glass, aluminium and steel industries, as well as partners, have been involved in the project’s development.

Involved Partners:
Partners should add value to the project and provide a wide range of skills. Charismatic individuals can be of great help, inspiring others to move the project forward and facing obstacles inherent to every project in a constructive way.

The project’s vision should be inclusive, inspiring and creative. But also realistic and attainable. By using the appropriate technology, safety standards and the correct planning, you will achieve a successful project.

Wider Engagement:
Ideally, all relevant audiences should participate in the LIFE OPTIMELT Project to fully comprehend the singularity of the project.
However, at some stages, it may be more useful to involve some audiences more than others (for example, engineering companies at the planning stage).
Engaging as many audiences as possible that represent the future markets using OPTIMELT™ Technology gives a strong understanding of what is possible in the near future.

Engagement Techniques:

- Be creative! Be disruptive! Be efficient!
- The most effective methods at different stages and for each audience. For example, bring in local provide technical support provide technical lectures at the university or visit technicians at glass, aluminum and steel factories.
- The quality of engagement is just as important as the method used, so create conditions that ensure good discussions and useful results.

Reflect on how to implicate the general public, professionals, politicians, academics and policymakers.

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Sustaining

When establishing a partnership the project’s legacy must be observed. Ensuring a resilient partnership:

- Good planning from the beginning is crucial for the project’s success. Deciding on the right partners from the beginning is vital as they should be passionate and focused on the success of a long-term project.
- It is necessary to build trusting relationships, communicate effectively, obtain compromises, and be open and transparent.
- If your plan is sound from the start of the project you are most likely ensuring that the partnership will continue beyond the extent of the project.
- Memorandum of understanding, Contract with agreed framework of project management, deliveries, partner’s responsibilities and Key Performance Indicators (KPI), are not the responsibility of one partner; the partnership needs to work together.
- Publicity and project communication should be shared by the whole partnership.

Being a reference for others:

Replicability and Transferability are essential for the sustainability of the technology. This will ensure that the technology is replicable and adaptable to other industries. These two features are essential to guarantee that the investments made throughout the project are aboveboard.

Sharing success:

Dissemination and communication of key messages help people and companies understand why the LIFE OPTIMELT Project is helping Europe reduce CO₂ emissions.

Evaluating

As soon as the project is implemented and the project’s base line is identified, it will be possible to monitor the effects on the short, medium and long-term actions.

Measuring the impact on glass quality:

Leerdam’s site must produce high quality glass. If glass quality is below the limits, the amount of energy employed has to be increased. Producing the right quality with the minimum amount of energy consumption is a must to sell the product.

Measuring the impact on environmental parameters:

Leerdam’s site continuously monitors its energy consumption levels to ensure they are the lowest possible but able to produce the quality that is required for the continuous production of commercial glass. CO₂ emissions are calculated and recorded on a daily basis. NOx, SOx and particulates are periodically measured to ensure they are the best class in glass furnaces in Europe.

Measuring social/economic impact:

The LIFE OPTIMELT Project has had a great impact on local employment. Leerdam’s site is the main employer in the Leerdam area. The LIFE OPTIMELT Project has helped Leerdam’s site maintain competitiveness, consolidate the company’s position as one of the leaders of the glass industry and reassure its local presence for the next decades.

The reduction of energy and emissions, while maintaining the quality of the product, will help the region stay competitive and maintain jobs.
The Program’s Results

A considerable reduction in emissions has been achieved at Libbey’s factory in Leerdam. The innovative OPTIMELT™ Technology has been implemented in oven L1 at Leerdam’s glass plant, with a capacity of 80 tons of glass/day, replacing two old 40 tons of glass/day furnaces.

Natural Gas consumption dropped by 48% = 131,238 GJ / year equivalent to the power produced by 4 super modern wind turbines / year = Heating of 2750 houses / year.

- CO₂ emissions dropped by 47% = 8940 tons / year.
  Equivalent to the CO₂ emitted by 4,500 cars / year.
- NOₓ emissions dropped by 86% = 117 tons / year.
  Equivalent to the NOₓ emitted by 11,700 cars / year.
- SOₓ emissions dropped by 80% = 35 tons / year.
  Equivalent to the SOₓ emitted by 140,000 cars / year.
Conclusion

The LIFE15 CCM/NL/ 000121 LIFE OPTIMELT Project has significantly contributed to enhancing air quality in the city of Leerdam, while improving the knowledge and skills of the employees at Libbey, and securing long term employment.

A great deal has been learned about how to implement OPTIMELT’s™ Technology on a real industrial scale, and on how to bring about the best impact on energy reduction. Its very essence is conveyed in this document, which provides a recipe for success in the implementation stage of a state-of-the-art technology at an industrial site.

We sincerely hope this enormous effort, backed by EU funds, will inspire and guide other Energy Intensive Industries to strongly decide on supporting the reduction of greenhouse emissions, contributing to the 2050 Low Carbon Road Map.
For more information:

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