Deliverable D5.1. Presentation: energy challenges of industrial parks - first insights from the S-PARCS project

Organisation: TECNALIA Research & Innovation
Main authors: Mirari Zaldua

Envisioning and Testing New Models of Sustainable Energy Cooperation and Services in Industrial Parks

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DELIVERABLE 1.3. – VERSION 1
WORK PACKAGE N° 1

Nature of the deliverable

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<th>R</th>
<th>Document, report (excluding the periodic and final reports)</th>
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<td>DEM</td>
<td>Demonstrate, pilot, prototype, plan designs</td>
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<td>Websites, patents filing, press &amp; media actions, videos, etc.</td>
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<td>Software, technical diagram, etc.</td>
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Dissemination Level

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Quality procedure

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Disclaimer

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1 Introduction and Executive summary

This is the first deliverable under WP5 which is aimed at turning the solutions and respective instruments developed in S-PARCS into real-world feasibility studies and therefore providing proofs-of-concept for their implementability, efficacy and efficiency. It is a power point presentation that first, introduces the six S-PARCS Lighthouse Industrial Parks and describes their expectations related to the project. Secondly, it explains the methods that are being used to engage companies within the parks, which already led to the involvement of almost 70 companies. Thirdly, it describes the status of the 13 opportunities for energy cooperation (see Table 1-1) that have been identified from the collaboration among the Lighthouse Industrial Park operators and companies, and the S-PARCS scientific partners. The opportunities range from building new energy infrastructure and installations to managerial actions and contractual instruments.

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Industrial Park</th>
<th>Country</th>
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<tr>
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<td>Spain</td>
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</table>

These opportunities and others that might come up as a result of the work that is being done on the parks will be further explored and assessed throughout the entire project and form the basis of the Energy Cooperation Plans (1 per park) to be produced until the end of the project. Feasibility assessments, assessment and collaboration with similar initiatives, training workshops, networking activities among Lighthouse and Follower Parks and internal park meetings are some of the tools that the S-PARCS partners will perform in the next months to build the adequate capacities for energy cooperation planning and implementation, to safeguard that the identified opportunities identified are duly followed-up, and to foster the creation of adequate framework conditions for the roll-out of these opportunities (see Figure 1-1). A Report on the potential for joint energy services in industrial parks (D5.2.), and a Public report on the feasibility studies of the most promising joint energy projects in the Lighthouse
Parks (D5.4) will be delivered in Month 18 and Month 30, prior to the elaboration of Energy Cooperation Plans for each of the six Lighthouse Parks in Month 33.

**Figure 1-1 Identification of the most promising opportunities: S-PARCS activities to follow-up and plan the implementation phase**

<table>
<thead>
<tr>
<th>Most promising opportunities: Follow-up and plan the implementation phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data gathering and Feasibility studies</td>
</tr>
<tr>
<td>Energy cooperation plan (1 per park)</td>
</tr>
</tbody>
</table>

**IDENTIFICATION and COLLABORATION with similar initiatives**

- **Selection of best practices elsewhere:** D1.3, Follower community...
- **Assessment of best practices:** See next steps in D1.3. (Interviews, assessment fiches and criteria...)
- **Learning from best practices:** Meetings...

**CAPACITY BUILDING**

- **TRAINING activities:**
  - 1 workshop/year/region. Liaise with D6.4. Training toolkit, etc.

**MANAGEMENT**

- **Inter-park meetings**
  - Consortium meetings, Networking activities in Task 6.5.

- **Internal park meetings**
  - At least 4 in each park.
D5.1. Presentation: energy challenges of industrial parks - first insights from the S-PARCS project

November 2018
Purpose of D5.1.

This presentation

...introduces the S-PARCS lighthouse industrial parks and the companies that have agreed to collaborate with S-PARCS (1)

...explains the previous experience on energy efficiency (2)

...describes the activities implemented to engage the companies in S-PARCS (2)

...presents the most promising opportunities for energy cooperation in the industrial parks (3)

...and outlines the next steps (4) for intra and inter-park energy cooperation
1. The Industrial Parks
# Overview of the industrial parks

| Tannery district of Ponte a Egola (Italy) | 1,200,000 sqm | 2400 | 115 | 14 | Tannery: 80/115 | Awarded in 2015 as Eco-Industrial Park (EIP) by the regional Government of Tuscany |
| Ennshafen port & business park (Austria) | 3,530,000 sqm | 2200 | 55 | 26 | Various / unspecified | TEN-T core node |
| Chemiepark (Austria) | 1,200,000 sqm | 3500 | 35 | 8 | Chemical Industry | High frequent & detailed monitoring |
| Vendas Novas (Portugal) | 985,000 sqm | Over 1200 | Around 60 | Cork Industry and Car Manufacturing | Located halfway between Évora and Lisbon; Railway |
| Okamika – Gizaburuaga (Spain) | 89,000 sqm | Around 300 | 35 | 9 | Rubber & rubber-related products, food industry, metal carpentry | Rural area. Crucial for local economy (avoid migration to larger cities) |
| Bildosola – Artea (Spain) | 300,000 sqm | Around 550 | 28 | 8 | Diversity. Metal processing | Rural area. Crucial for local economy (avoid migration to larger cities) |
The Tuscan tanning district is one of the **leading tanning companies** in Italy and globally.

Involves 7 municipalities in two provinces (Pisa and Florence).

**Key stakeholders:**

- **Cuoiodepur:** public-private consortium of approx. 80 companies as well as the local municipality of San Miniato. Task: Manage the common infrastructures of the park and in particular the wastewater treatment plant of the park (Partner in S-PARCS)

- **Consorzio Conciatori di Ponte a Egola:** The industrial association linked with the park
Ennshafen port & business park - Austria

Transhipments (2017): 355,000 TEU

Key stakeholders: Park organisation company „Ennshafen GmbH“ (Partner in S-PARCS)

Services within the park: Construction & maintenance infrastructure; free space for settlement; harbour master & general infrastructures; office space for rent; handling/storage/processing/packaging/bunkering/container terminal are provided by private companies
Key stakeholders: Borealis is the Chemiepark's utility operator and a S-PARCS project partner.

Services within the park: Borealis has utility cooperation agreements with the other main park companies.
Vendas Novas - Portugal

Key stakeholders:
- ADRAL

Accessibility and services:
- Good access to railway
- Wastewater treatment plant
Okamika-Gizaburuaga - Spain

Key stakeholders: Bizkaia Sortaldeko Industrialdea, S.A. (partner in S-PARCS);

Accessibility: Rural area. Around 30 km. away from the highway. Half way from the three main cities in the region (around 70km).

Services within the park: waste water treatment, rain water collection, fuel and gas purchase and supply (and maintenance of installations)
**Services within the park:** wastewater treatment, maintenance (cleaning, green areas, external lighting, roads, traffic signs, waste collection, etc.)

**Accessibility:** rural area, 20 km. away from the highway, halfway 2/3 main cities (45 km)

**Key stakeholders:** Arratiako Industrialdea, S.A. (in the process of becoming a third party of BSI)

**ECU:** existing public-private partnership (companies involved). Tool to facilitate energy cooperation
<table>
<thead>
<tr>
<th>Location</th>
<th>Expectations</th>
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</thead>
<tbody>
<tr>
<td>Tannery district of Ponte a Egola (Italy)</td>
<td>• Energy cooperation is considered as a chance to highlight the efforts of industrial park towards a low carbon economy.</td>
</tr>
<tr>
<td></td>
<td>• Reduction of energy costs.</td>
</tr>
<tr>
<td></td>
<td>• Energy autonomy in order to avoid the risks associated with the volatility of energy prices and enhance the use of potential energy inputs.</td>
</tr>
<tr>
<td>Ennshafen port &amp; business park (Austria)</td>
<td>Becoming more competitive in the global markets, integrating the local communities, cost savings realizable by joint procurement of energy and important resources, making the industrial park design more attractive to companies, etc.</td>
</tr>
<tr>
<td>Chemiepark (Austria)</td>
<td>Becoming more competitive in the global markets, integrating the local communities, cost savings realizable by joint procurement of energy and important resources, making the industrial park design more attractive to companies, etc.</td>
</tr>
<tr>
<td>Vendas Novas (Portugal)</td>
<td>• Development and acquisition of shared energy solutions for Alentejo Industrial Parks;</td>
</tr>
<tr>
<td></td>
<td>• Renewable energies and sustainable solutions as much as possible;</td>
</tr>
<tr>
<td></td>
<td>• Legal framework state of the art for shared energy solutions;</td>
</tr>
<tr>
<td>Okamika – Gizaburuaga (Spain)</td>
<td>• Reduction of energy costs: competitiveness</td>
</tr>
<tr>
<td></td>
<td>• Become greener: improve external image &amp; work on Social responsibility</td>
</tr>
<tr>
<td>Bildosola – Artea (Spain)</td>
<td></td>
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</tbody>
</table>
## Involved companies

<table>
<thead>
<tr>
<th>N.</th>
<th>Representativeness</th>
<th>Features</th>
<th>Experience in energy efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tannery district of Ponte a Egola (Italy)</strong></td>
<td>14</td>
<td>22% of total CUOIODEPUR shares (each company within the industrial park owns CUOIODEPUR shares*)</td>
<td>Tanneries (except 1 which sells chemicals for tanneries). Small-medium family businesses - suppliers of national and international luxury fashion companies.</td>
</tr>
<tr>
<td><strong>Ennshafen port &amp; business park (Austria)</strong></td>
<td>26</td>
<td>More than 90% of park energy consumption</td>
<td>Diverse companies with varying consumption of energy carriers.</td>
</tr>
<tr>
<td><strong>Chemiepark (Austria)</strong></td>
<td>8</td>
<td>More than 99% of park energy consumption</td>
<td>Chemical industry companies</td>
</tr>
<tr>
<td><strong>Okamika – Gizaburuaga (Spain)</strong></td>
<td>9</td>
<td>More than 40% of park energy consumption</td>
<td>Diverse sectors: Rubber, lighting, machining</td>
</tr>
<tr>
<td><strong>Bildosola – Artea (Spain)</strong></td>
<td>8</td>
<td>...</td>
<td>Various. Processing of mechanical components, machinery renting, transport, etc.</td>
</tr>
</tbody>
</table>

*The total CUOIODEPUR shares are calculated, excluded shares directly owned by CUOIODEPUR and the Municipality of San Miniato*
2. Previous experience on energy cooperation
Tannery district of Ponte a Egola – Italy

- **Solar energy:**
  - In 2008-2009, the joint purchasing of solar power plant on companies’ roofs was assessed. High investment and maintenance costs and uncertainties (end-of-life management of solar panels and lack of coverage of companies’ energy need) hindered the implementation.
  - 4 out of 14 companies have installed solar power plant as individual choice.

- **Joint purchase of energy:**
  - Many companies have joined purchasing groups (power and methane). At least three groups (promoted by different industrial associations).
  - Cuoiodepur provides the support of an energy consultant to assess the convenience for companies interested companies in the Cuoiodepur purchasing group.

- **Improvement of Wastewater treatment process**
  - Wastewater treatment plant managed by Cuoiodepur
  - Energy intensive infrastructure (treats approx 3 mio m³/year of wastewater)
  - Cuoiodepur is committed to improve wastewater treatment process and exploit by-products from the treatment for energy use (see opportunities chapter).
No energy cooperation within the park: except for refueling diesel vehicles at other companies’ stations.

One company analyzed the supply with excess steam of another company but cooperation was not considered feasible.

Two companies are currently involved in analyzing the usage of waste water excess heat for space heating.

One company plans to erect a new exothermal plant, which could be a driver for heat cooperation.

Some companies are interested in joint procurement of electricity and gas, while others’ procurement is done by the headquarter situated elsewhere.
Most companies in Chemiepark Linz origin from the former company Chemie Linz which they were a part of some years or decades ago.

There is a good cooperation, good job distribution and so far also an excellent basis for discussion. The changes of ownership and divisions influence the possibilities for further development.

Cooperation on utilities was maintained, obviously providing benefits to the single companies. There exist contractual agreements between Borealis and the other companies.

For reasons of supply quality, security and energy efficiency, energy flows are constantly monitored.
Okamika-Gizaburuaga- Spain

- Joint purchase of gas and fuel since 1987
- Waste-water treatment plant running until 2012 (as a temporary solution until this service was arranged by other authorities)
- Other energy efficiency initiatives (park level):
  - Lighting system replacement – LED lighting (paid by the Gizaburuaga city council)
Bildosola-Artea - Spain

- No energy cooperation and joint energy services (among companies)
- Other energy efficiency initiatives (park level):
  - 2 x 100kW rooftop PV panels installed
  - LED lighting (More than ½ park lighting replaced – roads, etc.) – paid by the city council
3. Activities to engage companies
Kick-off meeting on 11th of June 2018

- S-PARCS objectives presented to 21 companies located in the industrial park

Bilateral meetings with companies in Sept-Oct 2018:

- Bilateral meetings (interview to collect data and information) with 14 companies interested in the project.

Communication via email

- Cuoiodepur has sent periodical emails to engage companies within the industrial park
Some companies have signed a letter of intent in advance

Selection of 27 most promising companies. Criteria: expected high energy consumption (absolute terms), roof spaces for PV

Mailing and interview request – 27 contacted

26 interviews conducted

Workshop planned to communicate interview outcomes, and discuss park strategy and cooperation opportunities in 2019
Selection of 8 most promising companies. Criteria: energy consumption (absolute terms)

- 8 interviews
- 2 more general phone interviews are planned
- Workshop planned to communicate interview outcomes, and discuss park strategy and cooperation opportunities in 2019
Okamika-Gizaburuaga - Spain

- Project presentation event on 18.05.2018. 9 companies participated
- 6 companies interviewed
- Another event planned once the opportunities for energy cooperation are better assessed
Project presentation event on 25.05.2018. 7 companies participated
3 companies interviewed (3 more to be interviewed)
Another event planned once the opportunities for energy cooperation are better assessed
4. Opportunities for cooperation (*)

(*) The most promising opportunities are being assessed at the moment. More information will follow in subsequent deliverables. Another version of the presentation will be prepared around M30 with detailed information about the most promising opportunities and decision on which ones are picked for the Energy Cooperation Plan of the parks.
## Most promising opportunities

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#1 Biogas combined heat and power plant

Where? Ponte a Egola (Italy)

Combined heat and power plant that use biogas yielded by anaerobic co-digestion of vegetable tannery sludge

- **Maximum savings** that can be achieved while respecting national legislation: 7500 MWh per year might be sold to the grid (estimation)
- **Potential longer-term improvements**: Increasing energy independency by the production of power and heat thanks to biogas from vegetable tannery sludge.
- **Next steps**: Feasibility study to (better) determine:
  - Average time to implement the project
  - Maximum savings that can be achieved while respecting national legislation
  - Average payback-time:
  - Cost comparison present system / new system
  - Potential longer-term improvements
Where? Ponte a Egola (Italy)

Companies are interested in carrying out energy audit/energy monitoring within their production process in order to identify possible energy efficiency measures through a dedicated consultant.

- **Potential longer-term improvements**: This solution might support small tannery companies to invest in cost-effective energy efficiency measures by reducing costs for energy audit and consultancy.

- **Next steps**: Feasibility study to (better) determine:
  - Average time to implement the project
  - Maximum savings that can be achieved while respecting national legislation
  - Average payback-time:
  - Cost comparison present system / new system
  - Potential longer-term improvements
Where? Ennshafen (Austria)

On (large) company roofs or other areas at the Ennshafen site.

- **Next steps:** Feasibility study to determine:
  - Average time to implement the project
  - Maximum savings that can be achieved while respecting national legislation
  - Average payback-time:
  - Cost comparison present system / new system
  - Potential longer-term improvements
Where? Ennshafen (Austria)

Utilization of waste heat flux between relevant companies.

- **Next steps:** Feasibility study to determine:
  - Average time to implement the project
  - Maximum savings that can be achieved while respecting national legislation
  - Average payback-time:
  - Cost comparison present system / new system
  - Potential longer-term improvements
Where? Ennshafen (Austria)

Changes in Austrian law (01.01.2019) are expected to bring more options for quicker realization of new projects (especially for electricity)

- **Next steps:** Feasibility study to determine:
  - Average time to implement the project
  - Maximum savings that can be achieved while respecting national legislation
  - Average payback-time:
  - Cost comparison present system / new system
  - Potential longer-term improvements
Where? Ennshafen (Austria)

This is an essential topic in Europe in general to reduce air pollutants by cold ironing. A quite promising opportunity for Ennshafen and detailed planning and investigations are ongoing. Perhaps this topic can be combined with PV and electricity storage in the future.

**Next steps:** Feasibility study to determine:

- Average time to implement the project
- Maximum savings that can be achieved while respecting national legislation
- Average payback-time:
- Cost comparison present system / new system
- Potential longer-term improvements
Where? Chemiepark Linz (Austria)

Reinforced networking of the Chemiepark Linz. There is a good cooperation, good job distribution and so far also an excellent basis for discussion. The changes of ownership and divisions influence the possibilities for further development. Gathering ideas and optimization potential through discussion of responsibilities.

Next steps: Feasibility study to determine:

- Average time to implement the project
- Maximum savings that can be achieved while respecting national legislation
- Average payback-time:
- Cost comparison present system / new system
- Potential longer-term improvements
#8 Use of the Danube as a logistics route

Where? Chemiepark Linz (Austria)

Analysis of the use of the Danube as a logistics route for the Chemiepark Linz to carry out local / urban logistics and passenger transport with low emissions.

Next steps: Feasibility study to determine:

- Average time to implement the project
- Maximum savings that can be achieved while respecting national legislation
- Average payback-time:
- Cost comparison present system / new system
- Potential longer-term improvements
Where? Chemiepark Linz (Austria)

Analysis for future cooperation of companies regarding electricity (supply and demand) and gas (supply and demand)

Next steps: Feasibility study to determine:

- Average time to implement the project
- Maximum savings that can be achieved while respecting national legislation
- Average payback-time:
- Cost comparison present system / new system
- Potential longer-term improvements
#10 Solar PV for shared self-consumption

Where? Okamika-Gizaburuaga (Spain)

Shared self-consumption of PV is possible after the changes in the Royal Law RD 900/2015

- **Next steps:** Feasibility study (in the PV4GRID project) to determine:
  - Self-consumption/into the grid
  - Average time to implement the project
  - Maximum savings that can be achieved while respecting national legislation
  - Average payback-time:
  - Cost comparison present system / new system
  - Potential longer-term improvements:
Where? Okamika-Gizaburuaga and Bildosola-Artea (Spain)

- **Estimation of pay-back time:** Between 17-20 years
- **Next steps:** Feasibility study ready in 3 months to determine:
  - Average time to implement the project
  - Maximum savings that can be achieved while respecting national legislation
  - Average payback-time:
  - Cost comparison present system / new system
  - Potential longer-term improvements:
#12 LED lighting

Where? Bildosola-Artea (Spain)

- The **Feasibility assessment** revealed that:
  - **Investment and total annual savings** have been calculated
  - **Payback-time**: 5 years

- **Next steps**: The Town Council to decide if they can cover the investment. Otherwise negotiations to reach an agreement
Where? Okamika-Gizaburuaga and Bildosola-Artea (Spain)

- Experience from FEAF/AFV and SEA (local business association) show that companies can get interesting savings.
- Some companies on the parks showed interest in this initiative.
- The electricity consumption in the parks is not too high. Better to join existing initiatives.

Next steps:
- Explore the possibility to join the auctions organized by SEA
- Estimation of the savings
- Contact with the companies and offer this service
4. Next steps for intra and inter-park collaboration
Next steps: Intra and inter-park

Most promising opportunities: Follow-up and plan the implementation phase

Data gathering and Feasibility studies

Energy cooperation plan (1 per park)

IDENTIFICATION and COLLABORATION with similar initiatives

<table>
<thead>
<tr>
<th>Capacity Building</th>
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</thead>
<tbody>
<tr>
<td>Selection of best practices elsewhere: D1.3, Follower community...</td>
</tr>
<tr>
<td>Assessment of best practices: See next steps in D1.3. (Interviews, assessment fiche and criteria...)</td>
</tr>
<tr>
<td>Learning from best practices: Meetings...</td>
</tr>
</tbody>
</table>

TRAINING activities:
1 workshop/year/region. Liaise with D6.4. Training toolkit, etc.

Management

Inter-park meetings
Consortium meetings, Networking activities in Task 6.5.

Internal park meetings
At least 4 in each park