



# Skills Alliance for Industrial Symbiosis SPIRE-SAIS

A CROSS-SECTORAL BLUEPRINT FOR A SUSTAINABLE PROCESS INDUSTRY  
- Technological Development and Skills Requirements -

## INDUSTRIAL SYMBIOSIS

Cross sectoral developments of **Industrial Symbiosis** to be considered are not only the use of recycled products and transformed materials as raw materials for manufacturing new products but also (product, network, private and public) **transaction services** between industries offering new (common) market solutions, **business and cooperation models** (for reducing production costs, implementing new jobs, and including external customers).

Additionally, **data management opportunities** allowing product customization, new decision and management tools to improve industrial symbiosis are in place. Another dimension is the **sustainable development in a region**, guidance to local and regional authorities and promotion of public dialogue processes to ensure regional action plans as well as interregional learning and capacity building.



## ENERGY EFFICIENCY

Energy Efficiency developments are focusing on new technologies, systems and synergies among companies to optimize energy consumption and production to reduce the use of fossil fuels and the carbon footprint of industry as well as investment, maintenance, and management costs of the energy infrastructure.

Technology transfer and application is taking advantage of best available technologies including digitalisation, integrated control systems, artificial intelligence, consumption measurement and preventive maintenance. Replicable instruments for energy cooperation, business models, joint energy services for industrial parks are elaborated.

Amendments to existing regional/national/EU policies and legal frameworks to simplify energy cooperation/services at all governance levels are in place as well.

[#SPIRESAISBlueprint](#)

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## WORKFORCE ADJUSTMENTS

Related to these technological and economic developments the **workforce adjustment** for IS and EE is mainly characterised by multidisciplinary approaches, based on green and digital skills and new skills to manage the complexity of cross-sectorial cooperation in IS and EE implementation. The pro-active skills strategy has to consider technical as well as soft skills:

- 1** **Industrial Symbiosis skills:** communication and information, co-creation and cooperation with other sectors and local stakeholders and authorities, managing diversity to involve different stakeholders, materials and recycling know-how, fostering financially attractive paths with a strong positive impact on the environment.
- 2** **Creating IS facilitator profiles:** esp. new skills for networking, collaboration, system thinking, legislation (environmental economics & policy), special skills for waste & recycling, environmental improvement, entrepreneurship, financial, marketing and management skills, MFA (Material Flow Analysis) & LCA (Life Cycle Assessment), Marketing, and IT skills.
- 3** **Energy Efficiency:** green skills for the transition to a low-carbon economy; skills to manage managerial and technological changes, specific sectoral skills, integration of energy efficiency into daily operational practice in a continuous process, requiring additional skills, and interdisciplinary knowledge related to: energy management, renewable energy sources; energy auditing, building and facility management; energy trading, economics, financing, production planning and maintenance.

## SURVEY RESULTS

Additional to the desk research, a company survey across the different sectors reflects that the **current level of technological implementation is higher for EE rather than for IS**, although companies perceive IS and EE as an important opportunity emphasising their efforts in the future towards both the topics.

Moreover, some **barriers** belong to implementation practices and perception of solutions generating new skill demands in any category of workers. Main barriers are **cost of investments, working across different sectors, integration of regional stakeholders, regulatory issues, outdated plants, infrastructure and equipment, cooperation challenges, and skills gaps**. Currently the level of skills is stated to be generally lower for IS than for EE. In addition, the current training measures implemented by companies are mostly not formal and unstructured, emerging and future skill gaps will be overcome by internal and external training activities. The skills that mostly needed to be updated in the incoming 3-5 years are identified in **specific job-related skills, digital and personal skills**. Other useful skills identified within the survey are regulatory skills and entrepreneurship.

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## DETAILS AND CONTACTS

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