SPIRE Guidance

Thematic Workshops #1

Planning impactful workshops for SPIRE projects

What? – Projects often use workshops to share information with their stakeholders. With over 100 projects now in the SPIRE portfolio, it's important to bear in mind that projects do not exist in isolation. Thematic workshops are designed to build bridges between projects and share information on a common theme rather than being focused on a single project.

Why? – It is much more efficient for stakeholders to attend a workshop run by several projects, than to try and attend multiple events on similar topics. A greater number of stakeholders can also be reached through joint promotion from all the projects involved.

A thematic workshop encourages cross-project learning and can help avoid duplicating tasks.

A well-run interactive event gives projects a chance to find out the opinions of stakeholders, not just present at them. This valuable two-way dialogue can be enhanced by sending out a joint stakeholder survey in advance of the workshop.

A workshops based on a topic, rather than a project, comes across as a more attractive, educational opportunity for attendees, rather than as a sales pitch, making it more likely that they'll attend and engage.

If the planning of the workshop is linked to Technology Scanning, it can be an opportunity to involve experts from outside the SPIRE projects to update on parallel developments and research.

The workshop can help develop relationships between stakeholders on a common topic of interest, leading to future research collaborations.

Who? – Although it may be valid to focus such workshops on the research community, to enhance the impact of projects we recommend targeting industrial end-users and decision-makers, e.g. technical managers.

Where? – With a focus on attracting industry, it can be better to locate workshops close to industry clusters. Involving cluster organisations introduces a 'trusted intermediary', increasing the chance of high attendance. Including a relevant, near-by site visit is also likely to increase interest in the event.

Some collaborative SPIRE thematic workshops have been run as side-events at conferences. This approach allows several projects to have a bigger presence at the event, with costs shared, however unless the workshop is promoted well on the main programme, or scheduled not to clash with popular talks, it can be difficult to compete with the main event for an audience.

Continued in Thematic Workshops #2…

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SPRING
Setting the Framework for Enhanced Impact of SPIRE Projects

SPIRE Guidance

Thematic Workshops #2

Planning impactful workshops for SPIRE projects

…Continued from Thematic Workshops #1

Other Issues – If locating close to industry clusters (rather than in Brussels), there might be more attendees who are not so confident speaking English. This can be mitigated by structuring discussions around small groups, some of which could be facilitated in the local language, with key points only presented back in English.

Companies in some sectors tend to be less willing to engage with their competitors, which might make site visits unfeasible. Check well in advance whether hosting at an industrial site will bring any such restrictions.

Cross-project management needs consideration in the organisation of joint workshops, particularly since dissemination plans may have been decided at the beginning of the projects. We recommend making such plans flexible to allow work with other projects, and to use A.SPIRE and the SPIRE Coordinators Network Group to help.

Format – It is inevitable that workshops will involve presentations, but we recommend putting an emphasis on *communication*, not just dissemination. Consider including small-group workshop exercises, exploring potential barriers to future exploitation of the innovations; Q&A sessions with researchers and industry partners; interactive poster sessions; and *optional* educational sessions to give more background training to those who are new to the topic.

Don't be afraid of getting young researchers involved. It can be more engaging to hear several different voices, including those actively involved in *learning* within the project, rather than those just keen to demonstrate their many years of expertise! It is also a great experience for early-career researchers to present their work in this setting.

Get industry partners talking about the value that the innovation has brought, or could bring, to them. They may be more likely to talk about the qualitative, subjective aspects of the innovation and be frank about the challenges and limitations encountered, making for a more credible and engaging story for other industrialists in the room.

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SPRING
Setting the Framework for Enhanced Impact of SPIRE Projects

SPIRE Guidance

Project Output Summaries Overview

The gateway to resources from SPIRE projects

As of summer 2019, over 100 projects have been funded in the SPIRE programme. These projects have produced a valuable pool of resources for those looking to make energy, resource, and emissions improvements to processes and products in the process industries sectors.

Beyond their direct use by industry, many SPIRE project resources have value for education and training providers.

SPIRE project resources also have value to other SPIRE projects, current and future, to make sure efforts are focused on building new knowledge, not repeating what has already been done elsewhere.

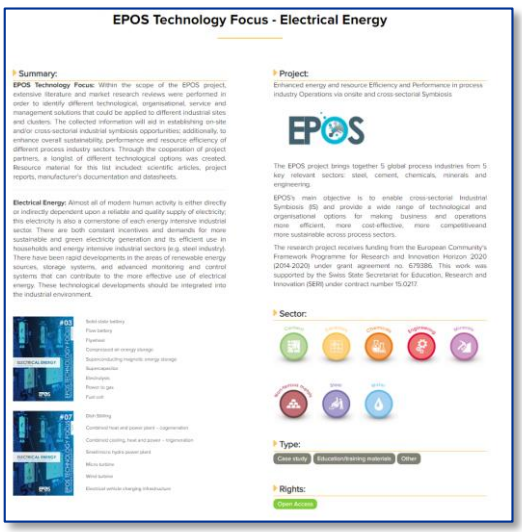
The SPIRE website is a gateway to these resources. It provides far more targeted information than general searching across all H2020 projects – it is a clear destination for process industry stakeholders looking for sustainable innovations and resources, and is far easier that having to search project by project.

The SPRING project has developed a framework to allow summaries to be made of potentially useful outputs and resources from projects:
https://www.spire2030.eu/projects/outputs

We recommend that SPIRE projects produce Project Output Summaries for:

1) Each *Key Exploitable Result* – the innovations at the core of projects
2) Key public deliverables – these are typically reports. It is best to focus on those reports that have the highest potential to be of use to SPIRE stakeholders (e.g. state-of-the-art technology reviews), rather than ones that were required to demonstrate progress and procedures (e.g. data management plans)
3) Selected communication, dissemination and/or training resources, e.g. videos, photos, presentations, maps, infographics.

Further guidance on producing Project Output Summaries can be found at:
bit.ly/SPIRE-ProjectOutputGuidance


EPOS Technology Focus - Electrical Energy

Summary:

EPOS Technology Focus: Within the scope of the EPOS project, extensive literature and market research reviews were performed in order to identify different technological, organisational, service and management solutions that could be applied to different industrial sites and clusters. The collected information will aid in establishing on-site and/or cross-sectorial industrial symbiosis opportunities; additionally, to enhance overall sustainability, performance and resource efficiency of different process industry sectors. Through the cooperation of project partners, a longlist of different technological options was created. Resource material for this list included: scientific articles, project reports, manufacturer's documentation and datasheets.

Electrical Energy: Almost all of modern human activity is either directly or indirectly dependent upon a reliable and quality supply of electricity; this electricity is also a cornerstone of each energy intensive industrial sector. There are both constant incentives and demands for more sustainable and green electricity generation and its efficient use in households and energy intensive industrial sectors (e.g. steel industry). There have been rapid developments in the areas of renewable energy sources, storage systems, and advanced monitoring and control systems that can contribute to the more effective use of electrical energy. These technological developments should be integrated into the industrial environment.

Project:

Enhanced energy and resource Efficiency and Performance in process industry Operations via onsite and cross-sectorial Symbiosis

EPOS

The EPOS project brings together 5 global process industries from 5 key relevant sectors: steel, cement, chemicals, minerals and engineering.

EPOS's main objective is to enable cross-sectorial Industrial Symbiosis (IS) and provide a wide range of technological and organisational options for making business and operations more efficient, more cost-effective, more competitiveand more sustainable across process sectors.

The research project receives funding from the European Community's Framework Programme for Research and Innovation Horizon 2020 (2014-2020) under grant agreement no. 678386. This work was supported by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 15.0212

Sector:

Type:

Case study | Education/training materials | Other

Rights:

Open Access

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SPIRE Guidance

Barriers to Industrial Exploitation

Maximising the industrial impact of SPIRE project outputs

Context – Technology developed in collaborative projects can often fail to deliver its full exploitation potential. Furthermore, there are significant challenges in the transfer of outputs into sectors beyond the core project focus.

Issues – Just being a great concept does not ensure that a technology delivered by a project will find widescale industrial acceptance. In most cases there will be barriers – some real, but some perceived – that left unaddressed result in project outputs being stuck at the proof of concept stage. Common barriers cited by SPIRE industries include:

- We have *many* projects that meet our investment criteria. We don't have the resource/ capital to do them all.
- We only make big investments every 5 years. The project timeline doesn't align with this.
- We are not convinced that the claims of this innovation will be as good as they say. It doesn't sound risk free.
- The technology is ok on a simple demonstrator, but it's much more complicated to fit that into the real plant alongside other systems.
- I think it sounds good but the operators will probably not be keen on changing how they operate the plant.
- We're different to sector X. I don't understand how that would work here.
- We normally only buy equipment from these approved suppliers
- That would be ok whilst we're running the plant in mode A, but we also need the plant to be flexible for other modes of operation.

Recommendations – Put simply, however good it is, a technology stands little chance of exploitation without a strong pull from industrial end users. In order to maximise the pull, a project team should consider the following actions:

- Build an understanding of the voice of the customer during the project, through stakeholder engagement. An innovation needs to have the potential to solve a real problem.
- Focus on communicating what an innovation **does**, rather that what it is.
- Ensure that limitations are clarified as well as success stories: don't over-sell and be clear on the risks.
- Introduce innovations and the value of new technologies through trusted value chains, or intermediaries (e.g. cluster organisations) for better end-user perception.
- Work with potential end-users to understand uncertainties that may hinder future investment
- Build an understanding of the regulatory landscape for the relevant industry sectors.
- Develop a business case for implementation of a new technology. This can be the story of how the innovation will benefit those working in the end-user organisation and what thresholds will make the investment worthwhile (e.g. if Carbon Tax goes above €x / tCO2e).

Above all, project teams must help industry to address the perceived barriers and avoid creating opportunities for people to raise them.

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SPIRE Guidance

Education and Training Resources from SPIRE projects

Enhancing the impact of resources beyond the project

Context – Every SPIRE project contains a wealth of valuable learning that could be used to educate and train those in industry and higher education. Recognising this, funding calls now oblige SPIRE projects to develop education and training materials.

Taking forward the recommendations of the SUSCHEM *Educate to Innovate* pilot in getting more educational resources from FP7 projects, SPRING has evaluated how these could be applied to the SPIRE programme.

Issues – More value could be obtained from the broader resources developed in projects, not just those specifically designed for education and training.

Until recently, projects lacked the frameworks and guidance to enable learning to reach its maximum impact.

Preconceptions about what makes a useful resource can lead to well-intentioned but misguided over-engineering which act as a brake to progress. Examples include "polished" products such as bespoke software (which can soon look dated, or just fail to work on different operating systems), or over-emphasising the production of whole course modules (course content varies across the EU, so one size doesn't fit all).

Recommendations – Our key recommendation is to focus on what those developing educational and training resources actually want.

Resources should be:

- **Rich in content** from industrial case studies
- **Flexible in use:** easy to integrate in existing curricula, adaptable to different learning styles, approaches and languages
- **Appealing to a broad community:** undergraduate, master level, and life-long learning
- **Accessible** across different media platforms

Use existing routes to "market". There is often more value in resources that can be incorporated into existing/ new courses than in stand-alone resources.

Don't overlook the educational value of other resources from projects, e.g. photos of demonstrator technologies, state-of-the-art reviews etc.

Other topics and themes that are valuable for education and training include how problems were identified and addressed; learning from approaches that didn't work; challenges of applying innovations to real industrial settings; and societal needs.

All these resources can be made more accessible to those interested in energy and resource efficiency solutions for the process industries through SPIRE's new Project Output Summaries framework: www.spire2030.eu/projects/outputs

For more guidance on enhancing the impact of SPIRE projects, see: www.spire2030.eu/spring

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SPIRE Guidance

Education and Training in SPIRE projects

Maximising the learning opportunities for project participants

Context – SPIRE projects have an expectation of educating and/or training participants in addition to developing innovative new technologies. However, this training varies greatly in both quantity and quality across projects.

Issues

Educational resources are developed too late in a project to have real impact for the project participants.

Different participants may have very different education and training needs or expectations, which often results in an over-focus on academic or high-level professional training.

Projects often work independently and miss opportunities for coordination of training activities on common topics across SPIRE projects.

Educational resources are sometimes designed as bespoke modules or packages, reducing potential for materials to be incorporated flexibly into pre-existing courses.

Recommendations

Education and training activities should be started as early as possible in a project to ensure that participants can apply new knowledge to their research activities. In many cases, project partners may have existing internal know-how that can be valuable for other partners, so this can be developed into *intra-project* training courses.

SPIRE projects should aim to share resources that could be incorporated or adapted into education and training courses, not just complete modules. The sharing of these resources can be done via the new Project Output structure developed in SPRING (www.spire2030.eu/projects/outputs).

Engaging with more 'education-focused' academic staff could allow better cross-project liaison to develop educational resources that could be used both within projects and to support teaching of students.

Projects should aim to integrate more 'task' based engagement for students, as demonstrated in the COCOP project, whereby students are given practical tasks based around gathering project data.

Where industry partners take a PhD student to work 100% on the project within the company, students gain hands-on experience of industrially-based research, and they can often be more effective by being able to work on data within the company 'firewall'. This approach was used successfully as part of the EPOS project.

Training should also be considered for technical staff and operators, not just scientific and senior engineering staff within industry. This will require consideration of the different types of training required by such colleagues, including the potential need for materials to be available in multiple languages

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SPRING
Setting the Framework for Enhanced Impact of SPIRE Projects

SPIRE Guidance

Planning for Exploitation #1

Effective management of Key Exploitable Results in SPIRE projects

Context – Starting from the proposal stage, consortia are required to describe what the likely exploitable outputs will be from their project.

Once projects have started, beyond standard progress reporting requirements, projects also receive many other requests for information on their exploitable outputs and likely impact (e.g. the annual SPIRE Progress Monitoring Report questionnaire and the Innovation Radar - www.innoradar.eu).

Issues – Exploitation planning can sometimes be left until late in the project, pushing innovations out into the market, rather than addressing what industry will want to *pull* through to commercialisation.

There is a tendency to focus on project actions, then jump to potential impacts, without detailed mapping of the outcomes that need to happen, the changes of behaviour and what will make key actors consider exploiting the innovations.

Projects can find it difficult and frustrating to collect similar bits of exploitation data for several different forms and requests.

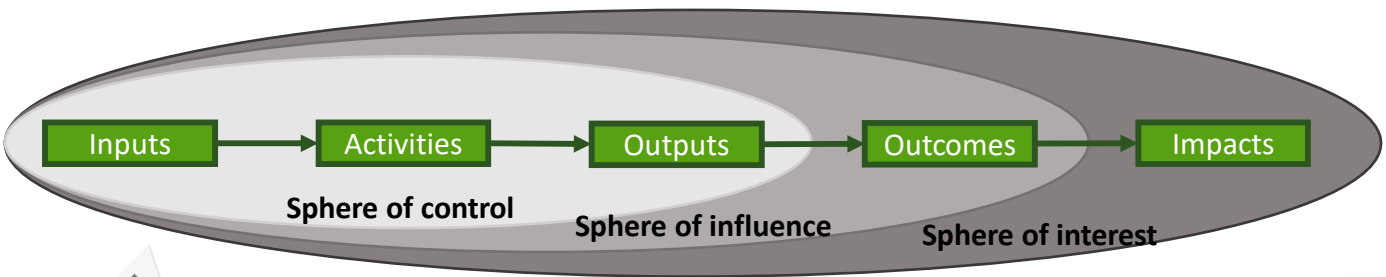
Recommendations

We recommend visually mapping out how the outputs/ results of your project could lead to desired outcomes in different downstream actors (e.g. changes in raw materials purchasing plans in sector X, adoption of new operating procedures in sector Y, incorporation of learning into training course Z), which then eventually deliver impact (e.g. energy and resource savings).

SPRING guidance on Industrial Barriers and Technology Scanning can help in developing an understanding of potential end-users of innovations.

To help manage exploitation planning and data requests, we recommend using, or taking learning from, the ***SPRING Exploitation Template, which is detailed on p2 of this guidance…***

For more guidance on enhancing the impact of SPIRE projects, see: www.spire2030.eu/spring



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SPRING
Setting the Framework for Enhanced Impact of SPIRE Projects

SPIRE Guidance

Planning for Exploitation #2

Effective management of Key Exploitable Results in SPIRE projects

SPRING has developed a standard template to aid data collection for the Key Exploitable Results (KERs) emerging from SPIRE projects. It has been developed to support key data gathering for the various impact and exploitation frameworks project participants are required to contribute to, as a means of simplifying the often-repetitive data gathering exercise, and it is suggested that this could form the basis of the project exploitation plan. The context for the use of this template is as follows:

- The Project Co-ordinator and Exploitation Manager set aside time in an early project General Meeting (ideally within the first 12 months of the project) to introduce the template and support the early capture of information related to each KER anticipated in the proposal.
- Project participants with a role in the development and/or exploitation of each KER complete and update the template on a regular basis (at a minimum in line with the formal project reporting timescales, though best practice would suggest at intervals aligned with General Assembly meetings), providing the information to the Exploitation Manager


SPIRE Key Exploitable Results Template

The Exploitation Manager uses the information provided to support as required:

- Reporting to Project Management Committees and/or General Assembly meetings on progress with exploitation
- Preparation of SPIRE Project Output Summaries (www.spire2030.eu/projects/outputs) and/or the pilot *Horizon Results Platform*
- Completion of the annual SPIRE Progress Monitoring Report questionnaire
- Completion of the Innovation Radar questionnaire

The SPRING Exploitation Template can be downloaded from the SPRING Website: http://bit.ly/SPIRE-ExploitationTemplate

For more guidance on enhancing the impact of SPIRE projects, see: www.spire2030.eu/spring

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SPRING
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SPIRE Guidance

Technology Scanning #1

Understanding the world outside your project to enhance impact

Context – A lot can happen from the time that a project proposal is first written. The world is moving fast and many technologies may arise as new competition to your project outputs during its life. Consequently, regular monitoring of technological evolution is fundamental to a meaningful benchmark of the performance of project outputs and to ensure that innovations stay relevant to industry needs.

Technology Scanning provides insight into the technological landscape, predicting the direction that technological changes will take or assessing the potential of a technology.

More than just a part of exploitation planning, Technology Scanning provides a broad range of information to assess and exploit the outputs potential, but also aids understanding of the actual barriers to the achievements of project objectives.

Issues

- It can be hard to summarise the collected information in a simple a short format.
- The information gathered may be difficult to guarantee clear understanding for all the partners, due to different technical languages (e.g. chemist vs. engineer).
- The potential research channels are numerous, so it can be difficult to collect the right and useful information.

Recommendations

- Technology Scanning is of greatest benefit to a project when it includes the analysis of possible cross-fertilisation actions: how technologies could be used in other applications and sectors.
- To perform an effective Technology Scan, the research requirements should be clearly and properly defined.
- The information resources spectrum is huge, so it is important to define from the beginning the aspects that should be investigated.
- Technology Scanning should be used regularly at all project stages for a continuous evaluation of the scenarios outside the project.
- Results from Technology Scanning can help inform *Thematic Workshops,* identifying technologies, events, research and potential industry exploiters outside of the SPIRE community.
- Technology Scanning should help drive project management, highlighting which features and specifications need to be addressed in order to maximise chances of industrial exploitation and commercial success.

An example methodology for Technology Scanning in SPIRE projects has been provided on p2-3 of this guidance.

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SPRING
Setting the Framework for Enhanced Impact of SPIRE Projects

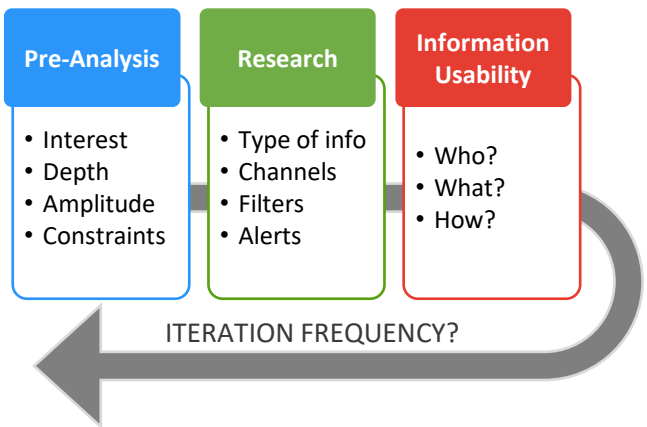
SPIRE Guidance

Technology Scanning #2

A methodology for SPIRE projects

The following outline of an example methodology builds on the SPRING recommendation to incorporate Technology Scanning into SPIRE projects.

Technology Scanning is an iterative technology validation process structured into three main phases: Pre-Analysis, Research, and Information Usability.



It is important to note that this is <u>not</u> a linear process. The project team should iterate through the stages at a frequency consistent with the length of project and the pace at which technology developments are being made on the topic globally.

Pre-analysis phase

The pre-analysis phase includes a brief overview of interesting technologies and their features, aiming at defining the information of interest for the project's partners and activities.

This phase is structured as follow:

- *Review:* general overview of the technologies developed, analysed or implemented within the project
- *Definition:* understanding of the technology of interest. Project experts will be involved in the choice, in order to align the activity on the project needs
- *Final analysis:* final characterization of the technology features concerning five key information fields: competitors, social, political, economic, technical. In this phase an analysis of information depth and amplitude will also be conducted.

Research

This phase can briefly be described as a technology scouting exercise focused on the technology chosen in the previous phase. This can often be done using public sources of information (e.g. websites, free articles) and professional tools:

Scientific Databases: e.g. Scopus, ScienceDirect, IEEE
Patent Databases: e.g. Derwent Innovation
Company Databases: e.g. Orbis (Bureau Van Dijk)

The use of filters and alerts can help streamline and automate some elements of this stage.

The final stage, **Information Usability**, is described on page 3 of this overview.

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SPIRE Guidance

Technology Scanning #3

A methodology for SPIRE projects

Information Usability – In the final stage of Technology Scanning, information collected through the research is presented in a format that is easily accessible and understandable to relevant project partners. A simple table for each exploitable output is a good approach to organise and manage the data.

OUTPUT NAME	Clear name to identify the output (chosen in pre-analysis phase)	**Example –** high temperature coating material
DESCRIPTION	An overview of the characteristics and properties of the output, ***why*** it has been developed	e.g. developed to reduce radiative heat transfer in X sector. Designed for retrofit…
FEATURES	Summarise the more detailed features of the output that constitute the technological and commercial value of the solutions.	e.g. reduces thermal energy dispersed through vessel walls, protects vessel from corrosion…
REQUIREMENTS	Mandatory characteristics that the output should have	e.g. stable at temperatures 500-700°C, stability for >5yrs in pH 3 conditions…
COMPETITORS	A list of the direct competitors with a brief description of the analysed solutions	e.g. Competitor X product, features, link to more info… Competitor Y product…
PATENTABILITY	Brief analysis of the patent landscape for the output sector and relevant patents, if available	e.g. Composition of coatings generally kept as trade secret, rather than patented…
OTHER USES	Other sectors outside the ones designated within the project, in which the output can be exploited	e.g. Steel furnaces – details… Petrochemical vessels – details…
ALTERNATIVE SOLUTIONS	Solutions that may be effective alternatives to the output	e.g. Alternative vessel materials of construction (intrinsic corrosion resistance)
BENCHMARK	Summary of collected information with focus on advantages and weaknesses, and potential further development of the output	e.g. Need to investigate ease of retrofit, versus competitor X; current data shows significantly lower use of critical raw materials than material Y

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SPRING
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SPIRE Guidance

SPIRE Network Groups

Encouraging and enabling collaboration between projects

Context – Lots of SPIRE projects are working on similar topics. Impact can be enhanced by planning joint activities with other projects and keeping other projects aware of plans.

With over 100 projects funded to-date in the SPIRE programme, however, it can be difficult to know who is interested in a topic (which may span several funding calls) and what activities are already at a formative stage of planning in other projects.

Sustainability assessments are generally a non-competitive component of SPIRE projects. Many projects however face similar challenges in selecting methodologies, tools and data for sustainability evaluations, so could benefit from greater cross-project collaboration to find consistent approaches to these challenges.

Through the SPRING project, SPIRE now has two network groups established on LinkedIn to encourage and enable collaboration between projects.

Recommended Actions for SPIRE Projects

Coordinators, or those aiding the overall project management of SPIRE projects can join the SPIRE Coordinators Network Group here:
https://www.linkedin.com/groups/8525162/

Within the group, please use the space for collaboration, such as informing other projects of ideas for events and stakeholder engagement (e.g. surveys).

Partners involved in sustainability evaluations can join the SPIRE Sustainability Practitioners Network Group here:
https://www.linkedin.com/groups/12143240/

For more information on Project SPRING:
www.spire2030.eu/spring

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SPIRE Guidance

Integrating Sustainability Into SPIRE Project Management

From kick-off to final assessments

Context – In collaborative projects it is common for the sustainability assessment to be prioritised only towards the end of the project, when most of the data is available from case studies. This approach can result in sustainability just being a reporting exercise, missing the opportunity to influence decision-making as the project progresses.

Three Coordination and Support Action SPIRE projects (STYLE, SAMT and MEASURE) reviewed sustainability assessments, in the context of SPIRE industries, and produced the following collated recommendations for *integrating* sustainability into SPIRE projects.

Recommendations

- **Define a benchmark** and communicate clearly the baseline against which the results have been assessed.
- Consider different aspects and dimensions of sustainability (environmental, economic **and social**). Inclusion of positive aspects and benefits within the assessments is encouraged.
- Apply life cycle based assessment methods and cover both upstream and downstream processes, where relevant to the system boundaries.
- Refer to accepted and well-known methods and indicators, and apply standardized methods and indicators and vocabulary, when available.
- Address uncertainty related to the applied methods, modelling choices and data, taking into account the Technology Readiness Level (TRL) of the assessed technology.
- Report transparently the applied **methods, functional unit, system boundaries, data sources, assumptions** and **limitations** of the study.

Plan to involve all the consortium in defining the benchmark and scope of the evaluation. Schedule time in the kick-off meeting, then at each period review, to at least discuss the expected qualitative impacts of your project. e.g. you might save resources, but use more energy.

Use the sustainability evaluation to help drive the project management. What claims do you need to prove? Which hotspots may make the innovation undesirable for exploitation? What data do you need to make the assessment more accurate?

A new SPIRE Sustainability Practitioners Group has also been launched to help share learning and develop methods across SPIRE projects. Project partners (from live, proposed, or past projects) can join the LinkedIn group here: https://www.linkedin.com/groups/12143240

For more guidance on enhancing the impact of SPIRE projects, see: www.spire2030.eu/spring

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