

# Recommendations Roadmap

Vision: By 2030, project teams in the EU process industries will routinely use sustainability evaluation tools to make better decisions when assessing process or product improvements

2017

2020

2025

2030

## SHORT TERM

## MEDIUM TERM

## LONG TERM

### Uptake

Provide guidance for use of early-stage and stage-gate approaches to sustainability evaluations in SPIRE projects – based on STYLE, SAMT, MEASURE

2.1



Trial guidance in 2017:SPIRE11 IMPACT Call

2.3



Require SPIRE projects to assess projects using a LCSA screening tool/method at an early stage of development

2.4



Require other relevant EU funded projects to assess projects using tools consistent with Ideal Toolkit guidelines

2.5



Develop 2018 SPIRE call for detailed toolkit framework & Open Access Qualitative Screening Tool

2.2



Support for development and maintenance of an Open Access version of toolkit based on the specifications for an Ideal Toolkit

2.8



Promotion of toolkit framework and case studies showing industry value

2.7



Promotion of STYLE recommendations and 'insights' (through A.SPIRE and spire2030.eu)

2.6



Coaching of organisations new to sustainability evaluations in the use of the Open Access tools/ toolkit

2.9



### Toolkit

2018 SPIRE Project: Specification of a toolkit framework based on High Level Features for an Ideal Toolkit. Includes development of an Open Access Qualitative Screening Tool

1.2



Improve existing tools following STYLE recommended features

1.1



Further development of Open Access toolkit based on the specifications for an Ideal Toolkit

1.3



Further development of in-house/ commercial sustainability evaluation tools in line with the specifications for an Ideal Toolkit

1.5



Prepare the toolkit for standardisation

1.4



Develop within (1.2) 2018 SPIRE Project

### Methodological

Standardise vocabulary and semantics across three pillars

3.7



Specify the methodology for calculating expected impacts of SPIRE projects

3.8



Improve robustness of the qualitative approach based on consensus and collaboration with 'softer sciences', i.e. human factors

3.1

Develop approaches to uncertainty and sensitivity analysis for data-lean evaluations

3.3

Improve the definition of functional unit/system boundaries in sustainability assessment tools

3.4

Improve extrapolation methods of lab-scale data to full-scale situations

3.5

Improve aggregation methodology and Multi-Criteria-Decision-Making

3.6

Develop approaches to incorporate social factors in sustainability evaluations

3.9

Find consensus on quantitative economic approach

3.10

Test and further improve the qualitative approach.

3.2



### Data

Review existing projects aiming at standardising data formats

Develop improved standards for harmonised data formats, including social and economic data

4.1



Streamline databases, with more efficient data input for industry and better meta data for capturing data quality and providence

4.2



Integrate social and economic data into public database

4.3



Audience



Industry



Life Cycle  
Management  
Community



Policy

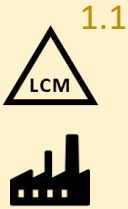
For more information see:  
[www.spire2030.eu/style](http://www.spire2030.eu/style)



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Commission  
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# Action

Improve existing tools following STYLE recommended features



**Recommendation Group:** Toolkit

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short term (2017+)

**Description:**

The STYLE project has proposed a set of High-Level Features for an *Ideal Toolkit* to meet the needs of the STYLE scenario:

*A project team is evaluating options for resource or energy improvement for their process or product and they need a pragmatic tool to check the broader sustainability implications of each technological solution*

The High-Level Features are detailed here: [STYLE Ideal Toolkit Framework](#)

An immediate short-term action from the STYLE project is for industry and the Life Cycle Management community to make improvements to existing sustainability analysis tools, incorporating elements from the High-Level Features for an *Ideal Toolkit*.

Related Actions: 

-

# Action

2018 SPIRE Project: Specification of a toolkit framework based on High-Level Features for an Ideal Toolkit. Includes development of an open access Qualitative Screening Tool



Recommendation Group:	Toolkit
Audience and Actors:	LCM Community, Industry, Policy (within SPIRE PPP)
Timescale:	Short to Medium term (2018+)

### Description:

Following *Action 2.2 (Development of the 2018 Call)*, this action represents the keystone recommendation of the STYLE project: a collaboration to develop an open access Qualitative Screening Tool (for early-stage projects) and a Guidance Framework for an *Ideal Toolkit* specification (to support industry decision making in projects from Technology Readiness Level 4-7).

The development of an open access Qualitative Screening Tool should address:

- Upfront Materiality Checks, to customize the tool for aspects such as sector, geography, time, process/product, corporate priorities etc. Elements of the setup could be done by sustainability specialists, or through default settings for a number of different sector scenarios.
- Qualitative screening questions for high-level analysis of Social, Economic and Environmental factors, supporting identification of likely hot spots
- Clear visualisation of results to aid decision making
- Importance of human factors and the nuances of questionnaire wording required to make the tool accessible, robust and intuitive to use across EU process sectors

The toolkit framework guidance should address:

- Identification and selection of methodologies for practical toolkits. The methodologies should consider best practice user-interface specification (e.g. data traceability, visualisations), in addition to sustainability indicator calculations.
- Elements of the STYLE High-Level Features for an *Ideal Toolkit* (detailed here: [Ideal Toolkit Framework](#))

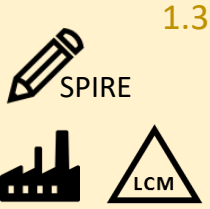
This action also encompasses a number of Methodological actions.

Related Actions:

- 2.2
- 3.1
- 3.3
- 3.4
- 3.5
- 3.6
- 3.9
- 3.10

# Action

Further development of an Open Access toolkit based on the specification for an Ideal Toolkit



Recommendation Group:	Toolkit
Audience and Actors:	LCM Community, Industry, Policy (within SPIRE PPP)
Timescale:	Medium term

**Description:**

Following *Action 2.8 (Support for further development and maintenance...)*, this action represents the collaborative project required to take the detailed toolkit specification from *Action 1.2* to develop an Open Access version of the toolkit.

The collaboration will need to involve:

- Software developers/ coding expertise (to build spreadsheets, websites and/or dedicated software’).
- Representatives from the Life Cycle Management community, to check that the tool is correctly interpreting the sustainability calculation methodologies.
- Representatives from industry and SME organisations (from across SPIRE sectors), to test ease of use in day-to-day operations, without in-house sustainability expertise.
- Training and support organisations, to develop and deliver training for the toolkit and provide user support once the tool is available for public use.

To ensure widespread adoption by EU process industries, the code and structure of the tool should be open access to allow organisations to customise elements to integrate with their own in-house systems.

Additional support for encouraging uptake of the toolkit is detailed in *Action 2.9*.

Related Actions:

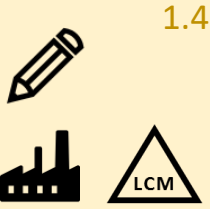
1.2

2.8

2.9

# Action

Prepare the toolkit for standardisation



**Recommendation Group:** Toolkit

**Audience and Actors:** LCM Community, Industry, Policy (standardisation)

**Timescale:** Medium to Long term

**Description:**  
Within *Action 1.2 (Development of Ideal Toolkit specification guidance)*, existing standards and methods should be incorporated into the toolkit as much as possible.

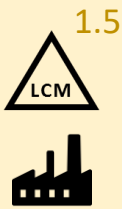
Once *Action 1.2* is complete, there may be further opportunities to develop standards that reflect the overall structure of the toolkit, or just elements of the toolkit where existing standards were either lacking or missing.

The topic may be proposed in the framework of ISO 26000.

Related Actions: 1.2 2.8

# Action

Further development of in-house/ commercial sustainability evaluation tools in line with the specifications for an Ideal Toolkit



**Recommendation Group:** Toolkit

**Audience and Actors:** LCM Community, Industry

**Timescale:** Medium to Long term

**Description:**  
In parallel with *Action 1.3 (Development of Open Access Toolkit)*, this action represents industry and the Life Cycle Management community developing in-house or commercial toolkits in line with the specifications for an Ideal Toolkit (*Action 1.2*).

Frontrunners in industry are expected to carry out this action; those with sustainability expertise and with existing tools in development. A number of large process industry organisations are likely to want to use bespoke versions of the toolkit to ensure optimum compatibility with their existing business systems and to keep confidential knowledge and data within their control.

Related Actions: [1.2](#) [1.3](#) [2.8](#)

Provide guidance for use of early-stage and stage-gate approaches to sustainability evaluations in SPIRE projects – based on STYLE, SAMT, MEASURE



Recommendation Group:	Uptake
Audience and Actors:	Policy (within SPIRE PPP)
Timescale:	Short term (2016-2019)

**Description:**

Many different approaches are used to assess sustainability within H2020:SPIRE projects. In general, these sustainability evaluations of the technology innovations are done in separate ‘Work Packages’ by specialists, often reliant on the generation of large amounts of data before the quantitative assessments can be completed.

Although comprehensive quantitative assessments should still play an important role in evaluating sustainability in EU projects, STYLE recommends that SPIRE projects integrate *qualitative* sustainability assessments into the early stages of project management and at review points. Such qualitative studies can be done as facilitated discussions with all project partners involved and can help get consortium consensus on:

- What is the benchmark scenario that the innovation will be judged against?
- What is the functional unit for the sustainability evaluation (e.g. is the product valued per kg, or is performance/ potency more important)?
- What are the boundaries for the sustainability evaluation? - are there changes to the raw materials involved (upstream); is it only a improvement to the process, with no changes to the product (no downstream impacts)?
- What are the likely key sustainability indicators that will be impacted most by the project? (e.g. expected to decrease water and primary raw material usage, but need to know impact on energy usage and life-cycle cost)
- What further data is required in the project in order to develop and quantify the sustainability assessment?

This guidance is being developed further in a collaboration between STYLE, SAMT and MEASURE projects to help current and future SPIRE projects address sustainability.

Related Actions:

1.2

2.3

3.8

Develop 2018 SPIRE call for detailed toolkit framework & Open Access Qualitative Screening Tool



**Recommendation Group:** Uptake

**Audience and Actors:** Policy (within SPIRE PPP)

**Timescale:** Short term (2016-2017)

**Description:**

The STYLE project sought to assemble a toolkit of existing readily-available sustainability evaluation tools against the following scenario:

*A project team is evaluating options for resource or energy improvement for their process or product and they need a pragmatic tool to check the broader sustainability implications of each technological solution*

A review of existing tools revealed that the tools most suited to the technical requirements of this scenario were industry in-house, Excel based tools, which are not open access and are specific to the organisation and sector in which they were developed. Through broader industry testing, stakeholder consultation and academic validation, the STYLE project has been able to provide a *high-level* summary of the structure and features of an Ideal Toolkit.

To bridge the gap towards all process sector organisations having access to such a sustainability evaluation toolkit, the STYLE projects recommends a call to be included in the 2018 round of SPIRE calls to:

- Develop an open access qualitative screening tool and upfront materiality check (particularly focusing on the needs of SMEs and organisations lacking sustainability expertise).
- Develop a detailed Ideal Toolkit specification framework, providing guidance on features and components required for evaluating sustainability and informing decision-making whilst progressing projects from Technology Readiness Level 4-7
- Identify default toolkit settings for grouping of SPIRE sub-sectors and scenarios.

This action is the policy enabler for the delivery of *Action 1.2*.

Related Actions: 1.2



Trial guidance in 2017:SPIRE11 IMPACT Call



- Recommendation Group:** Uptake
- Audience and Actors:** Projects funded under 2017:SPIRE11 call
- Timescale:** Short term (2016-2019)

**Description:**  
The 2017:SPIRE11 call is focused on ‘*Support for the enhancement of the impact of SPIRE PPP projects*’.

The STYLE project recommends that projects funded under this call could trial using the guidance for integrating sustainability studies into projects (*Action 2.1*) to test whether this can help improve the impact of SPIRE projects.

The findings from such a trial will feed into the definition of the Ideal Toolkit specification (*Action 1.2*).

# Action

2.4

Require SPIRE projects to assess projects using a Life Cycle Sustainability Assessment (LCSA) screening tool/ method at an early stage of development



**Recommendation Group:** Uptake

**Audience and Actors:** Policy (within SPIRE PPP)

**Timescale:** Medium term (2019+)

**Description:**  
Following a trial period of the guidance (*Action 2.3*), the SPIRE PPP could request that *all* SPIRE projects should assess sustainability within their projects using tools consistent with the STYLE high-level recommendations, at early stage and through consequent *Stage-Gates*.

Related Actions: [1.2](#) [2.3](#)

# Action

2.5

Require other relevant EU funded projects to assess projects using tools consistent with Ideal Toolkit guidelines



**Recommendation Group:** Uptake

**Audience and Actors:** Policy

**Timescale:** Medium to Long term

**Description:**  
Following the development of an Open Access screening tool, the EC could require all relevant EU funded projects to assess their sustainability using the tool or alternative tools consistent with the Ideal Toolkit guidelines.

Related Actions:

1.2

2.8

Promotion of STYLE recommendations and ‘insights’ (through A.SPIRE and spire2030.eu)



**Recommendation Group:** Uptake

**Audience and Actors:** Policy (through and beyond SPIRE PPP)

**Timescale:** Short term

**Description:**  
A.SPIRE should continue to promote the findings from STYLE, SAMT and MEASURE to current and future SPIRE projects.

Recommendations from all the 2014:SPIRE4 projects will be kept available through the SPIRE PPP website: [www.spire2030.eu](http://www.spire2030.eu)

- Additional promotional activities include:
- Promotion of intra- and inter- sectoral collaborations and sharing of sustainability tools. STYLE acts as an exemplar of the benefits found by industry involved in the project.
  - Broader communication within Life Cycle Management and academic communities to explain the challenges of using sustainability tools in real industrial settings on a day-to-day basis.
  - Further sharing of project recommendations through conferences (e.g. LCM2017) and press articles.

# Action

2.7

Promotion of toolkit framework and case studies showing industry value



**Recommendation Group:** Uptake

**Audience and Actors:** Policy

**Timescale:** Medium to Long term

**Description:**  
Promotional work will be required to encourage the use of the Ideal Toolkit framework and Open Access tools (*Actions 1.2, 2.8*).

Promotion should be based on showing the value of using the tools through case studies and success stories in different SPIRE sectors and across value chains.

Related Actions: 1.2 2.8

Support for the development and maintenance of an Open Access version of the toolkit, based on the specifications for an Ideal Toolkit



**Recommendation Group:** Uptake

**Audience and Actors:** Policy

**Timescale:** Medium term

**Description:**

The STYLE project recommends developing an Open Access version of the *Ideal Toolkit*, decreasing the costs for companies to integrate sustainability evaluations into the day-to-day operations. The toolkit will also allow organisations to improve, integrate and adapt their own in-house tools to get greater consistency across the SPIRE sectors and through value chains.

The toolkit should:

- follow the specification detailed in the *Ideal Toolkit Framework (Action 1.2)*
- be free or low fee access
- be easily accessible on standard IT hardware/ software setups (note that online based tools may not be suitable for all organisations who wish to keep sensitive data calculations within their own IT firewalls)
- have open source code so that industrialists can improve in-house tools and commercial organisations can develop tools that better meet the needs of ‘non-expert’ users (*see Action 1.3*)
- be supported beyond its initial development, to allow longer term maintenance and support for users

Related Actions:

1.2

1.3

Coaching of organisations new to sustainability evaluations in the use of the Open Access tools/ toolkit



**Recommendation Group:** Uptake

**Audience and Actors:** Policy, LCM Community, Industry

**Timescale:** Long term

**Description:**

A large proportion of industrial organisations, particularly SME’s, are new to sustainable evaluations and do not use any sustainability information whilst running improvement projects or designing new products and processes.

This recommendation addresses the need to actively coach these organisations to use the *Ideal Toolkit*. Coaching is required to get beyond these organisations just being aware of such tools and actually seeing how it can help their business. This should help to get the use of the *Toolkit* embedded into a larger proportion of EU’s process industries, rather than just the proactive few.

Coaching could be delivered through organisations with close links to SME’s, e.g. regional clusters, EEN etc.

# Action

Improve robustness of the qualitative approach based on consensus and collaboration with ‘softer sciences’, i.e. human factors



3.1

**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short to Medium term (2018+)

**Description:**

This recommendation calls for a collaboration with socio-economic impact experts to find consensus on which questions should be used with a qualitative screening tool and which weighting factors should be used for each sector.

The objective is to find a consensus on:

- The type of questions asked in the tool (activity description, expected impacts)
- The wording of questions required to get reproducible results and avoid mis-interpretation by those in different sectors and countries (involve human factors and language expertise)
- The degree of specificity of the questions and the number of questions that is acceptable
- The key aspects which have to be tackled for each sector, and those that can be neglected
- The aggregation method (weighting factors)

Solvay and Tata Steel in-house tools are examples of qualitative tools using such questions and weighting factors, which were tested in the STYLE project. A broader review of questions used in industry in-house tools could be done within this action.

The action should involve the Life Cycle Management Community and Industry willing to enhance credibility of qualitative sustainability assessment tools.

This action should be incorporated within the *Ideal Toolkit* and *Open Access Qualitative Screening Tool* development (*Action 1.2*). The qualitative approach is further developed in *Action 3.2*.

Related Actions:

1.2

3.2



# Action

Test and further improve the qualitative approach



3.2

**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Medium term

**Description:**

Following the preliminary works of *Action 3.1*, research is needed to increase the validity of the methods for qualitative tools.

A potential method for testing qualitative tools’ validity is to analyse the results of several comprehensive quantitative sustainability assessments in different SPIRE sectors and scenarios. This analysis could be used to identify the key aspects determining sustainability of product and process improvements in those scenarios, thus helping to improve the upfront materiality check and input forms in the tools.

The action should involve the Life Cycle Management Community and Industry willing to enhance credibility of qualitative sustainability assessment tools.

The results from this action should feed into the further development of the *Ideal Toolkit (Actions 1.3, 1.5)*.

Related Actions:

1.3

1.5

3.1

# Action

Develop approaches to uncertainty and sensitivity analysis for data-lean evaluations



3.3

**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short to Medium term (2018+)

**Description:**  
Research is needed to find the most suitable way to perform uncertainty and sensitivity analysis in fast sustainability assessments.

As knowledge and data are often lacking in early stage sustainability assessments, uncertainty is an important issue to tackle in tools. Methods need to be reviewed and further developed to allow tools to capture and process information relating to information input uncertainty (e.g. is the data from primary measured in-house sources, a public database or estimated?). Once calculations have been made using the data, the objective is to identify the most influential parameters, how sensitive they are to error and the level of confidence in the final results.

The action should involve the Life Cycle Management Community and Industry.

This action should be incorporated within the *Ideal Toolkit* and *Open Access Qualitative Screening Tool* development (*Action 1.2*). The results of the action would feed the further development of the toolkit in *Actions 1.3 and 1.5*.

Related Actions:

1.2

1.3

1.5

# Action

Improve the definition of functional unit and system boundaries in sustainability assessment tools



3.4

**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short to Medium term (2018+)

**Description:**  
Existing sustainability assessment tools often fail to clearly define and justify the functional unit and system boundaries. This is particularly difficult when trying to be consistent across sustainability pillars, e.g. when considering social aspects such as job creation.

This action calls for the development of improved methodologies for defining functional units and system boundaries in pragmatic assessment tools when incorporating Environmental, Social and Economic factors.

The action should involve the Life Cycle Management Community and Industry.

This action should be incorporated within the *Ideal Toolkit* and *Open Access Qualitative Screening Tool* development (*Action 1.2*). The results of the action would feed the further development of the toolkit in *Actions 1.3 and 1.5*.

Related Actions:

1.2

1.3

1.5

# Action

Improve extrapolation methods of lab-scale data to full-scale situations



3.5

**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short to Medium term (2018+)

**Description:**  
Sustainability assessments at early Technology Readiness Levels require the practitioner to be able to anticipate potential issues of scaling the assessment from lab-scale to full-scale industrial production. For example, yields of chemical processes are optimised throughout development by finding optimal reactor conditions and catalysts. Beyond the manufacturing plant, if the process requires rare materials, the upscaling can even change the market conditions.

A method and guidelines should be developed to tackle the challenges of scale-up, specific to early-stage assessments.

The action should involve the Life Cycle Management Community and Industry.

This action should be incorporated within the *Ideal Toolkit* and *Open Access Qualitative Screening Tool* development (*Action 1.2*). The results of the action would feed the further development of the toolkit in *Actions 1.3 and 1.5*.

Related Actions:

1.2

1.3

1.5

# Action

Improve aggregation methodology and Multi-Criteria-Decision-Making



3.6

**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short to Medium term (2018+)

**Description:**

Whether a sustainability assessment is early-stage and pragmatic or later stage fully quantitative, evaluation tools need to manage the need to aggregate and/or process data to make it more manageable and useful to the user. Aggregation can be done upfront to enable tools to use fewer (proxy) data inputs. At the back-end of a tool, the processing of data to make it possible for a user to clearly interpret results of Environmental, Economic and Social factors alongside each other is a vital, but non-trivial, element of good tool design.

This action calls for research and testing to recommend the best approach for aggregation in pragmatic, data-lean assessments.

The specific aggregation method of monetisation needs to be developed further to generate a more coherent system for monetary valuation of externalities, suitable for use in sustainability assessments.

Some of the developments required in Multi-Criteria-Decision-Making have been addressed in the MEASURE project.

The action should involve the Life Cycle Management Community and Industry.

This action should be incorporated within the *Ideal Toolkit* and *Open Access Qualitative Screening Tool* development (*Action 1.2*). The results of the action would feed the further development of the toolkit in *Actions 1.3 and 1.5*.

Related Actions:

1.2

1.3

1.5

Standardise vocabulary and semantics across three pillars



**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry, Policy (standardisation)

**Timescale:** Short term

**Description:**

The STYLE, SAMT and MEASURE projects agreed standardised vocabulary for a small number of relevant terms: *Indicators*, *Methodologies* and *Tools*. Deeper within the tools, there is a lack of standardised vocabulary and semantics for some individual indicators and terms.

In order to promote compatibility between tools and to increase common understanding of terms, the Life Cycle Management community should work to provide more standard definitions of terms. This should be done in the context of improving understanding for those who are not sustainability specialists.

The standardisation could be done in the context of ISO working groups, e.g.:

- ISO 26000 – Social responsibility
- ISO 14000 – Environmental management, e.g. ISO 14008 currently works on the monetary valuation of environmental impacts

Related Actions: 

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Specify the methodology for calculating expected impacts of SPIRE projects

3.8


**Recommendation Group:**Methodological

**Audience and Actors:**LCM Community, Policy (within SPIRE PPP)

**Timescale:**Short term

**Description:**  
The SPIRE Public Private Partnership has set sustainability goals for energy intensity, raw material intensity and CO<sub>2</sub> emissions, to be reached by 2030. The current defined metrics, however, push projects towards only considering environmental sustainability impacts and leave scope for different interpretations of the metrics.

The STYLE project supports recommendations from MEASURE to encourage projects to integrate Life Cycle Thinking in SPIRE projects’ evaluations and to better define metrics for the SPIRE goals:

RECOMMENDED LIFE CYCLE METRICS FOR THE EVALUATION OF THE SPIRE PPP TARGETS	
Recommended metrics	SPIRE sustainability goal by 2030
Cumulative energy demand [MJ] according to VDI 4600 guideline expressed in: <ul style="list-style-type: none"><li>• Non-renewable energy demand</li><li>• Renewable energy demand</li></ul>	A reduction in fossil energy intensity up to 30 % from current levels;
Total material consumption [kg] grouped in <ul style="list-style-type: none"><li>• critical/non-critical<sup>[56]</sup></li><li>• fossil/non-fossil</li></ul>	A reduction of up to 20 % in non-renewable, primary raw material intensity compared to current levels;
Global warming potential calculated via infrared radiative forcing (100 years) [kg CO <sub>2</sub> -eq.], based on IPCC data, 2013	Efficiency improvement of CO <sub>2</sub> - equivalent footprints of up to 40 % compared to current levels.

Extract from MEASURE Roadmap: [www.spire2030.eu/measure](http://www.spire2030.eu/measure)

These methodological guidelines can be incorporated into *Action 2.1*.

Related Actions: 2.1

# Action

Develop approaches to incorporate social factors in sustainability evaluations



3.9

**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short to Medium term (2018+)

**Description:**  
The challenge of evaluating social factors, including negative factors and potential benefits was highlighted by the STYLE project industrial partners and broader stakeholder engagement. Assessment methods used in the social pillar are the least mature amongst the three pillars of sustainability.

A good practice example was demonstrated by LafargeHolcim (cement, concrete and aggregates industry), with all pillars included in a monetised Integrated Profit and Loss account. However, such externalities costing is more challenging when considering process sectors that are more removed from end consumers (e.g. chemicals) and for projects that are in early-stage development. Early-stage is challenging because project teams may be lacking process data about the core manufacturing equipment, so are unlikely to know data relating to the social impacts of upstream and downstream operations.

This action recommends the further development of methods for evaluating social factors, particularly for the context of data-lean and pragmatic sustainability assessments.

The action should involve the Life Cycle Management Community and Industry.

This action should be incorporated within the *Ideal Toolkit* and *Open Access Qualitative Screening Tool* development (*Action 1.2*). The results of the action would feed the further development of the toolkit in *Actions 1.3 and 1.5*.

Related Actions:

1.2

1.3

1.5



# Action

Find consensus on quantitative economic approaches



**Recommendation Group:** Methodological

**Audience and Actors:** LCM Community, Industry

**Timescale:** Short to Medium term (2018+)

**Description:**

Multiple approaches with various meanings are currently used in sustainability evaluation tools to quantify economic impacts. Three different concepts are considered in the economic pillar:

- Impact on local GDP
- Value added during the life cycle
- Net (present) value of the product during the entire life cycle

This action recommends that an expert panel (e.g. through the European Commission, OECD) develop guidelines on which approach(es) to use for product/process improvement projects.

Until a consensus is found, tools should clearly explain which approach(es) they adopt and specify the limitations.

The action should also involve the Life Cycle Management Community and Industry.

This action should be incorporated within the *Ideal Toolkit* and *Open Access Qualitative Screening Tool* development (*Action 1.2*). The results of the action would feed the further development of the toolkit in *Actions 1.3 and 1.5*.

Related Actions:

1.2

1.3

1.5

# Action

4.1



Review existing projects aiming at standardising data formats; develop improved standards for harmonised data formats, including social and economic data

**Recommendation Group:** Data

**Audience and Actors:** LCM Community, Policy (standardisation)

**Timescale:** Short to Medium term

**Description:**  
A number of attempts have been made to standardise formats to allow data from different sources (eg. In-house industry data, public databases) to be used in sustainability assessment tools.

- Several approaches are in current existence\*, including:
- EcoSpold – developed for the ecoinvent database; used by many LCA software packages
  - ISO 14048(SPINE) – a Technical Reference, which lacked the specificity to be used as a software exchange format
  - European LCA center formats – specifies a core format for data, but with flexibility for software-specific fields.
  - The ILCD data format

Feedback from STYLE stakeholder engagement leads to the recommendation that improvements need to be made in the development and standardisation of a common data format, particularly with the integration of social and economic factors and improved meta data (providing transparency on data quality and limitations).

Improvements could also be made to standardise how software packages manage the data, so that unused information is not lost when processed data is passed to the next piece of software.

\*Reference: <https://www.pre-sustainability.com/download/SimaPro8IntroductionToLCA.pdf>

**Related Actions:**

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# Action

4.2



Streamline databases, with more efficient data input for industry and better meta data for capturing data quality and providence

**Recommendation Group:** Data

**Audience and Actors:** Policy (European Commission), Industry

**Timescale:** Initialise Short term – Maintain Long term

**Description:**

In parallel to the standardisation of data formats, the management of databases should be streamlined to:

- Improve data quality and availability
  - More frequent updates of the data
  - Improved meta data
  - Social and economic data integrated
- Decrease the cost and risk for companies sharing data
  - Avoiding asking for the same information multiple times
  - Increasing confidentiality protection

To ensure that quality databases are readily accessible across the EU process industries, the STYLE project recommends that the European Commission support this development of a streamlined process for collecting and managing data.

Industry will also need to be engaged in this action, to ensure that the improved process supports and encourages industry to share data.

Related Actions: [4.1](#)

# Action

Integrate social and economic data into public databases



**Recommendation Group:** Data

**Audience and Actors:** LCM Community, Policy

**Timescale:** Medium to Long term

**Description:**  
Sector level data on economic impacts (cost databases) and social impacts (employment, occupational health etc.) should be collected and integrated into the streamlined database (*Action 4.2*).

This action requires the LCM community to specify the type of data needed, notably based on the work related to the Social Hotspot Database.

Industrial associations could be used to compile the sector level data.

Related Actions: [4.2](#)