

Solutions for sustainability assessment in your project

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Sustainability assessment, commonly performed using life cycle assessment (LCA), means many different things, depending on the study scope and context. This worksheet is a first attempt at helping you find solutions for the type of sustainability assessment that is feasible and helpful for your project.

Based on our experience, we have developed a chart of LCA strategies and solutions, split into low, medium, and high levels of both complexity and relevance of LCA to your project. To help you situate your project on this chart, the first step is to answer the following ten questions on a separate piece of paper:

Relevance	Complexity
1. Summarize your research question in one sentence	1. Are you working with a new technology or refining an existing technology?
2. Do you have a separate budget item for LCA or sustainability assessment?	2. Are you working with one technology or a series of interdependent technologies?
3. How much time have you or your team allocated to sustainability assessment?	3. Is your technology or product at the lab, demonstration, or production scale?
4. Do the project stakeholders (i.e. the ones who will use your project outcomes) have a commitment to use sustainability assessment in their decision-making?	4. Will your technology or product cause large changes in society or consumer behavior?
5. How important is sustainability assessment to a successful outcome for your project, in your opinion?	5. Are the buyers or users of your product well known and understood?

Based on your answers to the above questions, please find the categories for both complexity and relevance that best fit your project:

Relevance	Complexity
Low	
<p>LCA results are "nice to have", but aren't in key deliverables</p> <p>LCA results won't change study outcomes or stakeholder decisions</p>	<p>Refinement of existing technology</p> <p>Small change to an existing system</p> <p>No or very small changes in consumer behavior, society, or economy</p> <p>Users of technology well known and understood</p> <p>Little to no uncertainty in main system parameters</p>
Medium	
<p>LCA results are included in key deliverables</p> <p>LCA results play a small role in informing study outcomes or stakeholder decisions</p>	<p>New technology that directly replaces or competes with older technologies</p> <ul style="list-style-type: none"> • e.g. shale gas directly competes with other natural gas extraction; end users don't change behavior <p>Large changes, but to an existing system</p> <ul style="list-style-type: none"> • e.g. carbon fiber body panels change auto weight and aerodynamics, but don't change auto sizes or usage patterns <p>Technology exists in demonstration plants; cost/efficiency scaling curves well understood</p> <p>Uncertainty in important system parameters well characterized, even if sometimes high</p>
High	
<p>LCA results will help decide key study outcomes</p> <p>LCA is a systematic tool used throughout project</p> <p>LCA is a large part of project budget</p>	<p>New technologies or behaviors which don't directly replace or compete with existing technologies or behaviors</p> <p>Study examines a system of interdependent technologies</p> <p>Technology only exists at lab scale; cost/efficiency scaling curves not well understood</p> <p>Enabling technology for other types of technological development or installation</p> <ul style="list-style-type: none"> • e.g. new batteries allow for more renewable energy penetration • e.g. self-driving cars have higher capacity factors, tilting cost equations towards higher initial cost with lower running costs <p>Fundamental changes in mobility behavior</p> <ul style="list-style-type: none"> • e.g. increase of 20% in annual passenger kilometers <p>Users of technology are diverse and poorly understood</p> <p>High uncertainty in important system parameters</p>

Relevance/Importance of Sustainability Assessment	High	Use of full LCA software Basic sensitivity and uncertainty analysis	Sensitivity and uncertainty analysis External LCA partner	Integrated technology-LCA models Multiple external partners Global sensitivity and uncertainty analysis Global trade modeling/General equilibrium models
	Medium	Systematic literature review Basic calculations with ecoinvent or input/output database	Use of full LCA software Basic sensitivity and uncertainty analysis Parameterized scenario analysis	Parameterized scenario analysis Use of full LCA software External partner Sensitivity and uncertainty analysis
	Low	Comparison with literature results for competing systems	Systematic literature review Basic calculations with ecoinvent or input/output database	Basic scenario analysis Sensitivity and uncertainty analysis Attributional and consequential LCA system models
		Low	Medium	High
Complexity of Sustainability Assessment				

Work primarily done by you	Bachelor student thesis or Projektarbeit	Masters thesis	Combination of your work, students, and external partners
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