Vestas®

SiteLCA™

Life Cycle Assessment

Wind. It means the world to us.™

How will environmental analysis improve your **business case certainty?**

Advanced environmental analysis

Site Life Cycle Assessment (Site LCA™) is a state-of-the-art environmental analysis tool that delivers transparent, highly accurate data about your wind power plant's environmental performance.

What are the benefits of Site LCA™?

- Site LCA™ provides invaluable site-specific evidence to support external communications campaigns.
- It supports the planning and permitting process, providing transparent evidence to underpin consultations and responses to stakeholders.
- And it strengthens business case certainty by supporting the environmental case for a wind energy strategy.
- For example, by providing key performance indicators, such as carbon footprint, recyclability and return-on energy, or to address other specific issues of concern.

How does LCA work?

Site LCA™ assesses the entire life cycle of the wind power plant based on comprehensive turbine models, from raw material extraction through to manufacture, installation, operation and end-of-life performance.

The leading edge environmental analysis covers the entire turbine – that's around 25,000 parts per turbine, with parts mapped for materials, production processes and disposal.

The results of the Site LCA™ are then collated into a comprehensive report on the environmental impact of your wind power plant. These data are not only accurate, detailed and specific to your wind power project, but also ISO compliant and third-party reviewed.

It is a unique and highly transparent approach that we have developed, which has been independently acknowledged as state-of-the-art analysis of wind power in the International Journal of Life Cycle Assessment.

99.95%

Typically 99.95% of the wind plant is mapped by Site LCA™.

How can Site LCA strengthen your **investment?**

Site LCA™ delivers transparent environmental facts about your wind power plant, such as carbon footprint, return-on-energy, water use or specific environmental benefits.

These evidence-based indicators strengthen your business case by supporting your energy strategy with hard facts about issues such as the case for wind energy and the environmental benefits of the wind power plant, and they help improve your sustainability index rating.

By delivering verified environmental data about a wind power plant, Site LCA™ also provides information to guide your decommissioning plan, help win public acceptance, and underpin consultations and responses with other stakeholders, such as anti-wind groups.

What does Site LCA™ do?

The layout of a wind power site has a significant impact on the total environmental performance of the plant. For example, site-specific parts contribute around 25% to 40% of the plant's total carbon footprint over its complete lifetime.

Site LCA™ assesses in detail the site-specific environmental benefits or risks of a wind power plant.

It can also quantify specific environmental impacts, such as:

- Use of 'rare earth elements'
- Use of sulphur hexafluoride gas (SF_6) in switchgear, to support plans for safe recovery at end-of-life
- Potential benefits of turbine recycling or repowering
- Potential benefits of blade dismantling and recycling
- Impacts of transporting turbine parts to the construction site

The resulting Site LCA™ report sets out the findings of the assessment, based on Vestas' comprehensive turbine models and analysis of how the plant performs for the site operating conditions. It outlines the scope of the LCA undertaken and details the power plant's performance against key performance indicators:

- Carbon footprint - grams of CO_2-equivalents per kWh
- Turbine recyclability - % mass of turbine
- Return-on energy - months payback or number times paid back
- Material breakdown - mass of various materials in turbine or entire power plant
- Water-use - grams of water per kWh
- Environmental savings, for example, from recycling, repowering, or SF_6 take-back at end-of-life
- Other potential impact indicators

What is the Site LCA™ process?

Site LCA covers several stages. These define the wind project to be assessed, collect the data, generate the results and produce the report. The findings can then be reviewed by a third party according to ISO standards.

What's more, the reliable, leading edge data models we use in Site LCA™ allow for much quicker and more effective service delivery compared to other routes, at exceptionally high standards.

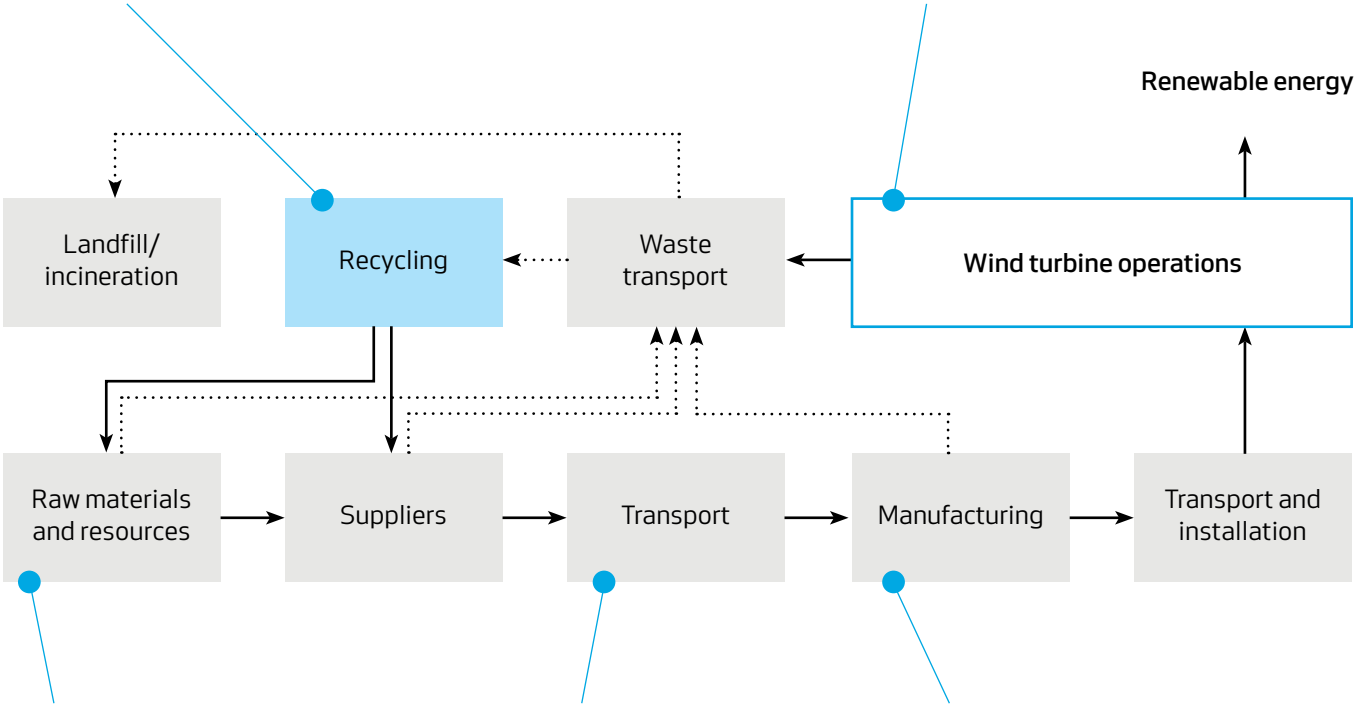
The advanced modelling techniques used by Site LCA™ create a highly comprehensive, site-specific model of the power plant and its performance parameters.

Site LCA™ is conducted according to the latest ISO standards for life cycle assessment. It is also reviewed by a third party to ensure the scientific and technical validity of the study and the transparency of reporting.

Recycling benefits
Site LCA™ can also quantify the power plant's key environmental benefits (such as turbine recycling or repowering options at end-of-life) and identify potential environmental risks, such as SF_6 gas or material breakdown for plant decommissioning .

The LCA models use advanced end-of-life modelling of the wind plant, whereby the turbine (or parts of it) is disassembled into its source components for disposal.

Indicators per kWh
Site LCA™ evaluates the site-specific conditions, including the power plant performance for site-specific energy production. It also factors in turbine type, site equipment, plant layout and manufacturing supply chain.



Entire Value chain
Site LCA™ assesses the entire life cycle of the wind power plant, from raw material extraction through to end-of-life disposal.

Transport impact
All stages of transport are considered. For example, inbound raw materials and components used in production, transport to plant site and end-of-life recycling or disposal.

Entire wind power plant
For every stage in the life cycle, all components within the turbine are assessed. Plus all the parts that make up the entire power plant up to the grid connection, including foundations, site cabling and transformer station.

Site LCA™ uses factual data on your power plant's performance to strengthen external communications, inform your energy strategy and simplify planning and permitting issues.

What information is required for a **Site LCA™?**

The information needed for a Site LCA™ combines data from existing power plant models, together with additional site-specific data collected by the Site LCA™ data collection form.

This includes data about plant layout and site equipment, locations of turbine part production, fuel used for transport, and site energy production and losses. In addition, some data on component production may be needed from suppliers.

Succeeding together

Partnership is at the cornerstone of everything we do. Our team of experienced project managers and LCA experts works in partnership with you to understand and deliver to your needs.

We are dedicated to helping you achieve your commercial objectives and to estimating the likely environmental performance from your wind power project.

We do this by providing you with access to the wealth of knowledge that comes from our three decades' experience in the wind industry; knowledge that is continually expanding as we lead the way in researching new and more effective wind power technologies.

Key benefits of Site LCA™:

- Assured facts for external communications
- Strengthen brand image and public accountability
- Facilitate permitting process
- Increase public acceptance
- Quantify environmental aspects for site management
- Improve your rating on sustainability indexes

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