# METHODS

## Henning Larsen Architects consistently applies Integrated Energy Design (IED) to ensure a systematic dialogue with a focus on a holistic approach, good solutions and a healthy, flexible and resource-conscious architecture in the constructing and operating phases.

Formulating a common objective in terms of sustainability early on in the process ensures that all partners take the same approach to the process and work constructively to reach the same goals. It is important to provide the framework for an operational, integrated design process with measurable criteria.

This ensures a smooth and open process and provides the opportunity to more systematically apply the most central criteria and themes for each development area.

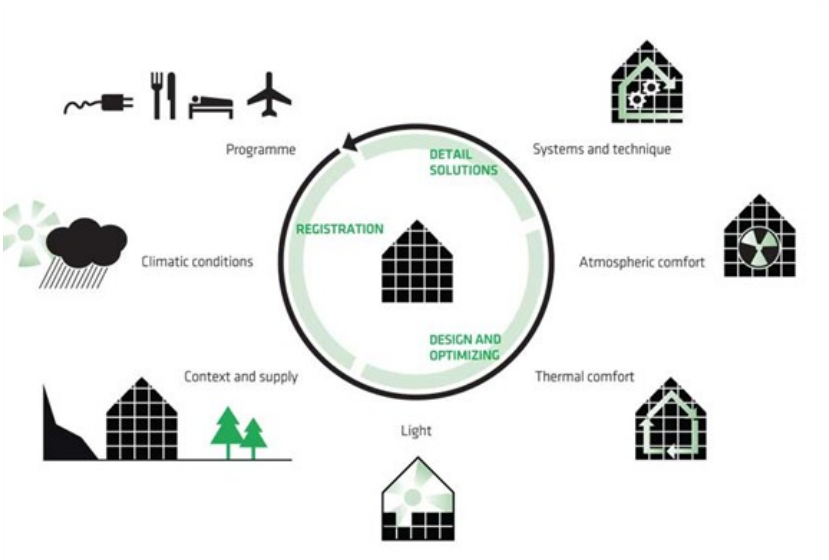
Henning Larsen Architects applies the following five steps to achieve sustainability:

1. Localisation. Examination of local opportunities and limitations.
2. Objective. Defining an overall objective.
3. Objective. Defining the exact and measurable objective.
4. Tools. Catalogue of solutions.
5. Assessment and comparison of tools. Performance and synergy opportunities.

With a multicriteria-based assessment as a decision tool, it is possible to ensure a systematic assessment and comparison of the tools applied. This ensures that the right tools are brought into play and that the connection between financial aspects and achieved environmental gain is taken into account.

# SUSTAINABILITY IN BUILDINGS AND BUILDING COMPONENTS

Sustainable buildings are characterised by an optimal use of the energy supplied, a first quality indoor climate, low use of non-recyclable resources, minimal emissions to the air and water as well as a high degree of flexibility and adaptability.




Buildings must meet a number of different - and often conflicting - requirements, which will only get higher in the future. For instance, requirements for insulation conflict with requirements for indoor climate conditions. State-of-the-art research on indoor climate has revealed a connection between the indoor climate in buildings, our productivity and general health condition as we spend 90 % of our life indoors.

In the beginning of a project essential decisions are made as regards the sustainability of the building in the long run.

Geometrical elements are difficult to change but technical installations can continuously be improved as new technology becomes available. Decisions concerning functional positioning, orientation, compactness, room height and dept etc. should be long-lasting.

**Facade**
The facade has great influence on the energy consumption of a building. The building envelope should be optimised and dynamic by means of the right materials, right technology and optimal functionality with a view to create the best possible indoor climate. The facade also plays a role as regards creating a good outdoor climate.

# SUSTAINABILITY IN MASTERPLANS

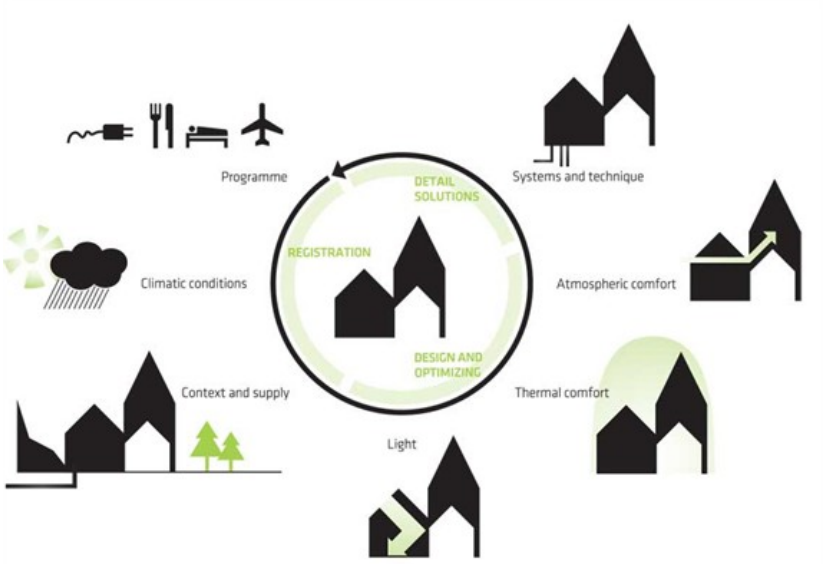
A masterplan outlines the vision for a large area. The vision responds to many aspects and is often the structural idea that links together the various buildings of the area. The vision should bring together the many wishes and dreams in an easily communicated story and, at the same time, it should constitute the basis of the subsequent process and dialogue.

The masterplan should have a robust structure that can withstand numerous changes and modifications of the design of buildings and urban spaces. This flexibility ensures that the masterplan will last many years into the future. Many of the contextual conditions that will be used as design parameters later on in the sketching phase are outlined in the masterplan. The plan constitutes the logic element that informs of and places demands on the building design.

Synergy is an essential element. Especially in the field of sustainability, buildings can help each other in terms of sun, shade and wind.

Sustainable urban development mainly comprises these five areas:

- Transportation.
- Energy consumption. The spatial configuration of a masterplan constitutes the basis for building low-energy buildings, that is, city density, city functions, double functions and a good outdoor climate (microclimate).
- Drainage and recycling, including waste water and waste disposal.
- Climate adaptation.
- Behaviour. Involvement and motivation of citizens and stakeholders.




**Social and health sustainability**
A social city is a vibrant and pulsating city with a diverse variety of citizens. Its urban spaces and nature should encourage experiences, enthusiasm and activity for everyone, for instance by qualifying important, strategic areas and creating a good microclimate where cultural gathering points and cafés can be situated. The city should have a variety of different types of homes just as its functions should be mixed and integrated. The dialogue with citizens and users should be a central aspect.

**Financial sustainability**
Sustainable initiatives should be supported by economic key figures as an important basis for decision throughout the process from strategy to realised solutions.
The city should be attractive to private and public investors and have a structure robust enough to adopt changes and provide the opportunity for a flexible utilisation of spaces and buildings - a robust structure can withstand many changes and modifications. A financially sustainable strategy is the basis for a successful and future-proof city.

# SUSTAINABLE MATERIALS

The choice of materials is one of the most visible green building strategies. Materials can be evaluated based on two criteria:

1. The effect of the life cycle of a specific material on the environment, that is, the effect of the production or extraction of the material, its use and disposal.

2. The influence of the materials on building users as regards their health and well-being. With a well-defined strategy for the selection of materials, an unhealthy indoor climate is avoided.

Environmentally friendly materials
Responsible materials take into account supply chain management and the product administration system, including social, financial and environmental issues as regards product production. This includes a consideration of the following aspects in connection with the selection of materials:

- Specify materials with a low environmental impact, resource-efficient materials, construction materials and apparatus.
- Specify materials with a low energy consumption, that is, the energy used in resource extraction, production and shipping.
- Use local products to avoid long transportation.
- Avoid using materials that are harmful to the environment in the production process and which are toxic when used and/or end up as dangerous waste material after ended life cycle.
- Avoid toxic and dangerous materials.
- Avoid ozone-destroying materials.
- Avoid volatile organic compounds in solvents in varnish, paint and glue. These solvents result in a poor and unhealthy indoor climate.
- Choose products made in controlled conditions.
- Avoid materials that recklessly exploit the limited resources of nature. Avoid use of wood without a FSC certificate.
- Use environmentally certified products, that is, which meet the ISO14001 international environmental standards.
- Specify recycling construction materials. Make sure that the products applied are safe and free of arsenic, asbestos, lead and other harmful substances.
- Consider the durability/solidness of the materials, especially in areas with heavy traffic and in other aggressive environments.

In addition, the subsequent cleaning should be taken into consideration and the number of dust-collecting surfaces should be minimised.