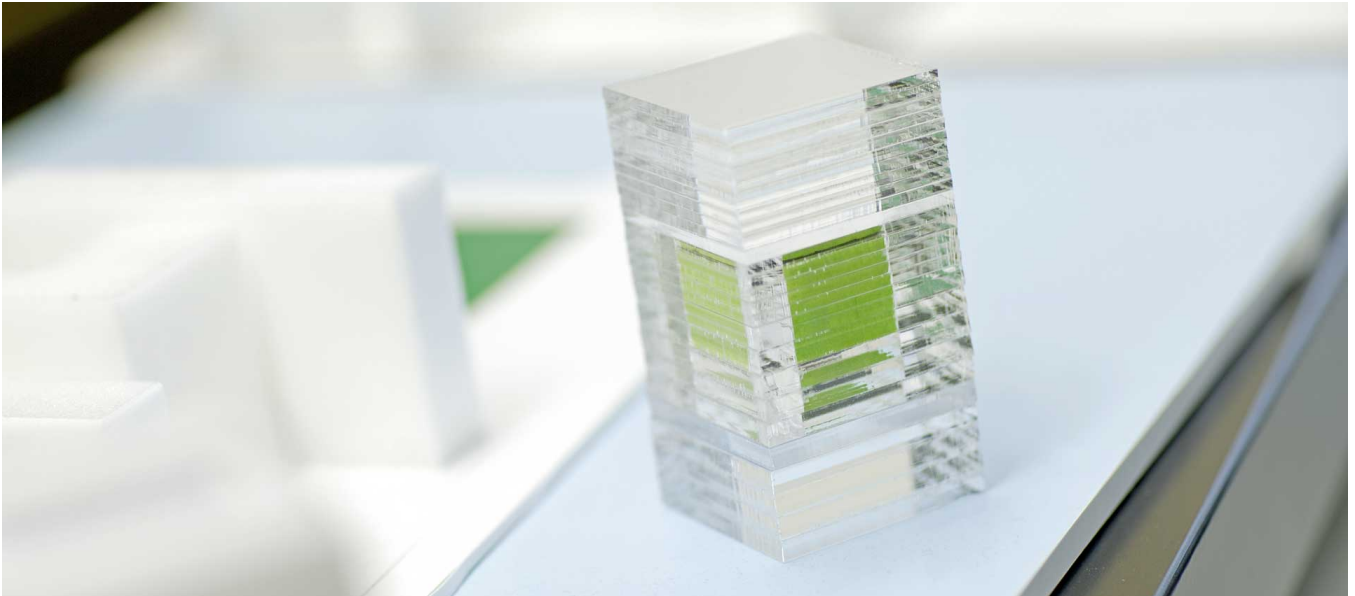


## SUSTAINABILITY

---



**Incorporating sustainability into building processes has never been more important. Almost 40 % of CO<sub>2</sub> emissions come from the building industry. Energy-efficiency should be incorporated into building designs, which means that knowledge of energy optimisation is an essential design parameter. The design should be energy-efficient from conception.**

Henning Larsen Architects attaches great importance to designing environmentally friendly and integrated, energy-efficient solutions. Our projects are characterised by a high degree of social responsibility, not only in relation to materials and production but also regarding positive, social spaces encouraging intimacy and community.

The objective of sustainability is to create value ranging from soft, social values to location-determined, infrastructural, demographic and climatic values. This holistic approach creates increased value through sustainability.

Increased value is achieved when a majority of the objectives can interact and the selected tools support each other. We aim only to apply tools that create value for all aspects. In this way, qualitative and quantitative objectives will interact.

Numerous solutions to reduce energy consumption in building processes already exist and these should be incorporated into projects from the very first sketches. As one of our projects has demonstrated it is possible to save 80 % of the energy consumption simply by designing and situating correctly (functional positioning, height, width and depth) in relation to the surrounding urban landscape and climate.

Therefore, achieving sustainability is all about making the right design decisions from the beginning, taking into consideration the indoor climate and comfort. It is essential to know the connection between energy reduction and indoor climate. Often, energy consumption compensates for the poor indoor climate and comfort of a building.

## MEASURABLE SUSTAINABILITY

---

It is important to distinguish between objectives and tools. Numerous opportunities are often available, which means that project partners and stakeholders must agree on choosing the right initiatives in order to meet the sustainable objectives of the project.

In order to make qualified choices, the environmental, social, health and financial aspects of an objective should be comparable. Henning Larsen Architects divides sustainable initiatives into a hierarchy of tools to make it clear how to achieve the outlined sustainable profile. The hierarchy has three layers:

### Reduction

Energy consumption is reduced by optimising the design, functional configuration and overall technical systems of the building.

### Optimisation

Energy consumption is further reduced by incorporating components, intelligent control and energy-reducing materials supporting the objective.

### Production

By means of local, building-integrated energy production and additional energy infrastructure, a surplus of energy can be achieved.

Knowledge and evidence-based design connects art, innovation and science creating new opportunities for building processes and planning.

Evidence-based design qualifies the design itself and supports the projects of Henning Larsen Architects.

Good architecture balances aesthetics, location, function, space, comfort and materials into a whole. Energy reduction is a parameter equal to traditional parameters. We constantly strive to strengthen our designs and creative intuition by means of knowledge and evidence.

The most sustainable energy is the energy saved, which is why it is important to reduce the energy consumption of a building in the operating phase by optimising the design and programmatic distribution in the building. It is possible to save approx. 80 % of energy consumption by means of passive, non-energy consuming properties - e.g. geometry optimisation, programme distribution, facade optimisation, floor height, daylight, shape, orientation and masterplan.

## MULTICRITERIA-BASED ASSESSMENT AS A DECISION TOOL

A systematic assessment and comparison of the tools applied ensures that a high priority is assigned to energy-efficiency and sustainability and to meeting the necessary objectives. In addition, it ensures that relevant tools are brought into play and that the connection between financial aspects and achieved environmental gain is taken into account in the prioritisation phase.

Ventilations-princip	Anlægs-	Design og	Indeklima	Signalfordi	Drifts-omkostninger	Energi og CO <sub>2</sub>	Total
	Omkøbstninger	Arkitektur	Forbete og slømp	Til omgivelser	Forbete og slømp	Forbete og slømp	Særlig vurdering
Alternativ 1 Mekanisk ventilation	Indeks 1.0 	Særlige armaturer og aggregater følger ikke i afhængig af systemet. Høje omkostninger og vedligeholdelse. 	Sikker god luftkvalitet hele året. Mulighed for optiske termiske rumkøledeffekter og solvarme. 	Ingen 	Næsten stor et udbytte til ventilationen. 	Bruger et energi til lufttransport. 	Godt 
Alternativ 2 Naturlig ventilation (dog ikke laboratorier)	Indeks 0.60 	Luft fra vinduer et, bænke. Længere for at åbne vinduer og lukke dem op igen. Store skilte. 	Perioder med træk og rige luftkvalitet. Mulighed for hele luftkvalitet hele året. Dag i sommer, eftermiddag mere. 	"Går godt" 	Lavt elforbrug, men øget varme behov om vinteren. 	Bruger ikke energi til lufttransport. Ingen varme generering. 	Under middel 
Alternativ 3 Hybrid ventilation, s. varme generering i fællesrum Mekanisk i klasserum Naturlig i fællesrum	Indeks 0.70 	Luft fra vinduer et, bænke. Kan om overlys og/eller skilte. Kan om overlys for at åbne øjeblik og/eller store skilte. 	Sikker god luftkvalitet i klasserum hele året. Mulighed for optiske termiske rumkøledeffekter i fællesrum. Perioder med mindre god luftkvalitet i fællesrum. 	"Mellem grøn godt" 	Lavere elforbrug, men øget varme behov om vinteren. 	Bruger mindre energi til lufttransport. 	Middel 
Alternativ 4 Hybrid ventilation med varme generering i fællesrum Mekanisk i klasserum Naturlig i fællesrum	Indeks 0.90 	Kan om overlys og store skilte til sparrning af luft. Kan om overlys for at åbne øjeblik og/eller store skilte. Kan om overlys for at åbne øjeblik og/eller store skilte. 	Sikker god luftkvalitet i klasserum hele året. Perioder med mindre god luftkvalitet i fællesrum. Godt rumkøledeffekt hele året, ved hjælp af solvarme i fællesrum. 	"Mellem grøn godt" 	Lavere elforbrug, men lidt ekstra varme behov om vinteren. 	Kan varme generere. Bruger energi til lufttransport i perioder. 	Godt og energisparende 

Based on the objective and outlined initiatives, concrete assessments of the effects of the initiatives compared to the objectives is made. The assessments can be summed up in a clear table constituting a joint basis for the decisions regarding which initiatives should be incorporated into the overall project. The table is helpful in the early stages of a project as well as in the detailed design phase.

In overall terms, the method for assessment strengthens the collaboration between architects, engineers, clients and other stakeholders in all project stages.

The method is easily comprehensible and clear. It brings clarity to the objectives of the project and ensures that objectives and tools are not mixed.