Sustainability criteria for healthcare building design

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Granlund Group

Founded 1960

1300 employees

120 M€ revenue in 2022

We focus strongly on innovation and development and our aim is to create wellbeing in the built environment.

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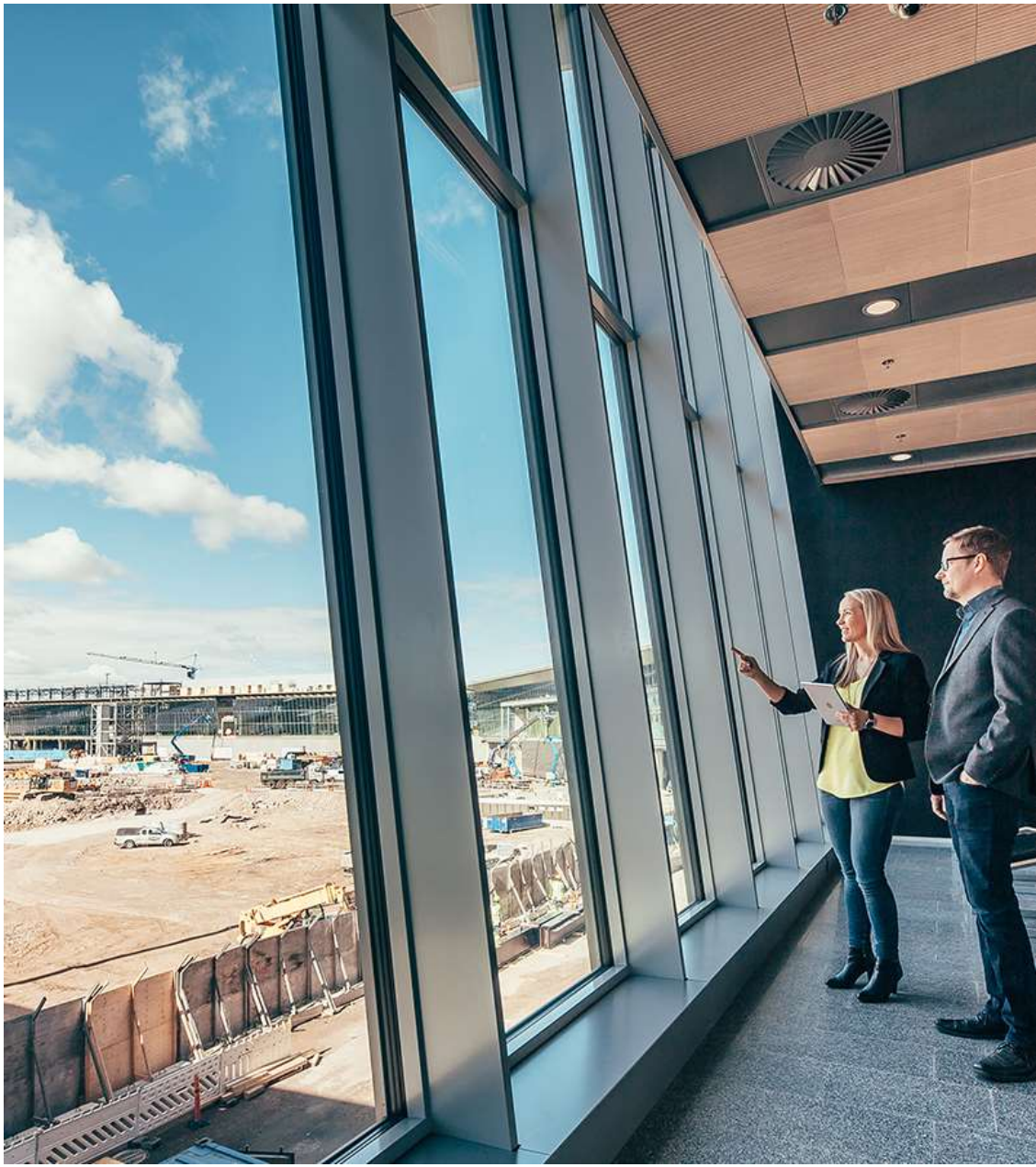
MEP-design

Consulting



Agenda

Their framework they use for sustainable and climate resilient buildings,
How they use sustainability criteria as a funding condition,
Specific criteria that bet on a healthy building or increasing well-being
Necessary design strategies (criteria) to make our healthcare infrastructure climate resilient.

Construction project sustainability -drivers

Sustainability target management in construction project (Target setting and management)

Case. Laakso hospital, Helsinki

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Construction project sustainability drivers

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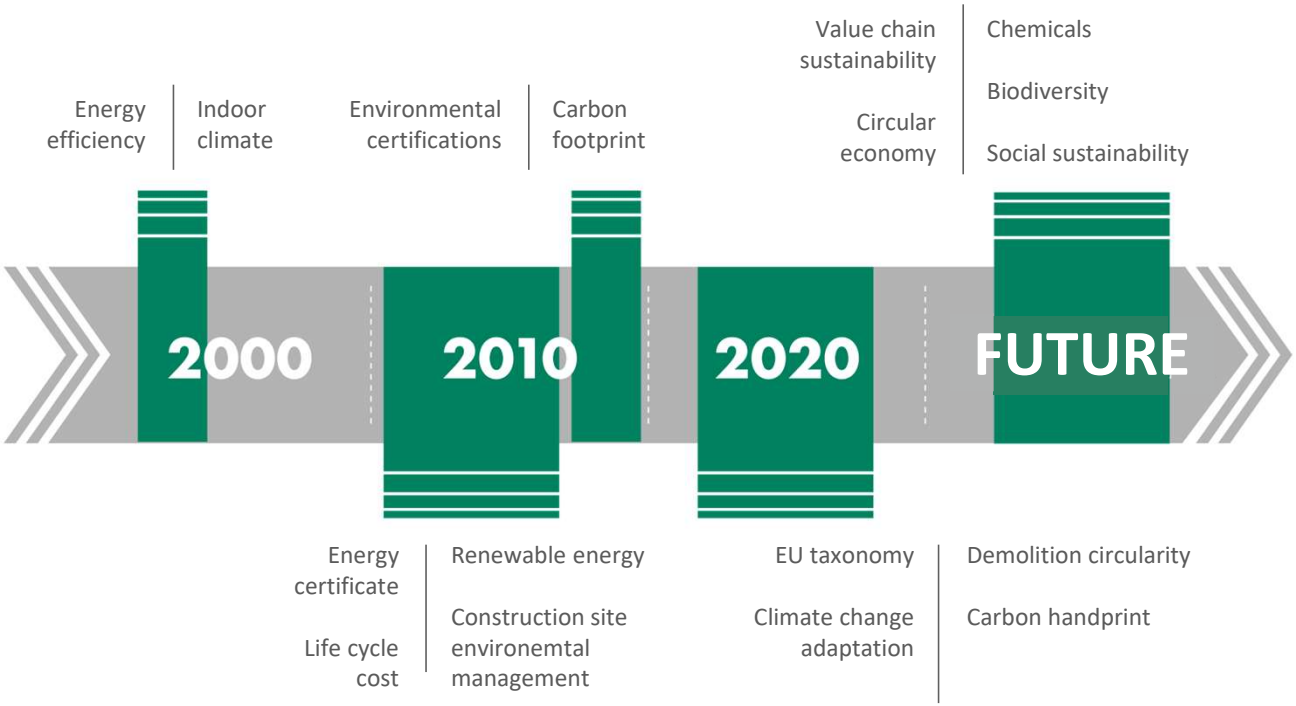
Construction project sustainability

- Requirements and aspects for construction project sustainability have increased
- Actions considered advanced two years a go may be minimum requirement today

DEVELOPMENT OF CONSTRUCTION PROJECT SUSTAINABILITY MANAGEMENT



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Where do the sustainability goals and requirements come from?

REGULATION

National regulations: Most Nordic countries already have or are planning whole life carbon regulation

EU regulation: Ambitious green transition regulation e.g. EU taxonomy, Corporate sustainability reporting (CSRD), EPBD update, Green claims

FINANCE AND INVESTORS

- Money is flowing towars sustainable investment opportunities
- EU taxonomy provides framework and minimum requirements for sustainable investment

CITIES

- Many cities have ambitious climate and sustainability targets
- Cities have high impact on construction via city planning and local regulation

PRIVATE SECTOR AND BUILDING USERS

- Increasing amount of companies have set up carbon neutrality and transition targets
- CSRD sets requirements for value chain sustainability

ENERGY COST

- Energy price has increased which reflects to property maintenance cost
- Increasing demand for cost effective energy solutions

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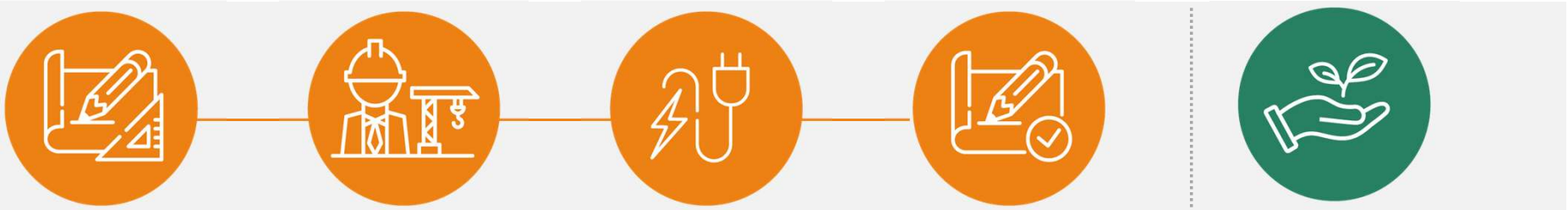
Finland: Updated building regulation will add limits for whole life carbon starting from 1.1.2026

24.10.2025

CLIMATE DECLARATION

Whole life carbon assessment

Whole life carbon assessment enables a numeric analysis of climate emissions over the whole life cycle of a building. The assessment is based on EN 15978 and Level(s) standards.



PRODUCT STAGE

A1 Raw material supply

A2 Transportation to manufacturing

A3 Manufacturing

CONSTRUCTION

A4 Transportartion to building

A5 Installation to building

USE STAGE

B1 Use / applications
B2 Maintenance
B3 Repair
B4 Replacement
B5 Refurbishment
B6 Operational energy
B7 Operational water

END OF LIFE

C1 Deconstruction

C2 Transportation of end-of-life

C3 Waste processing

C4 Disposal

BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY

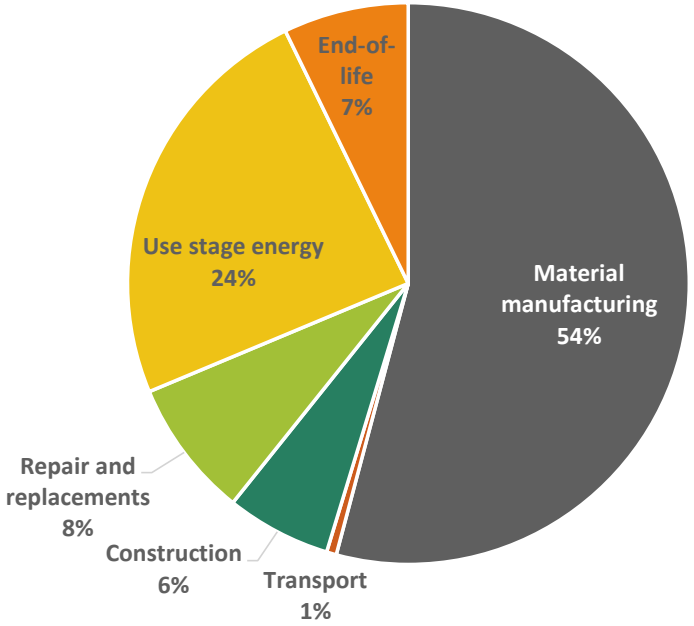
D1 Reuse

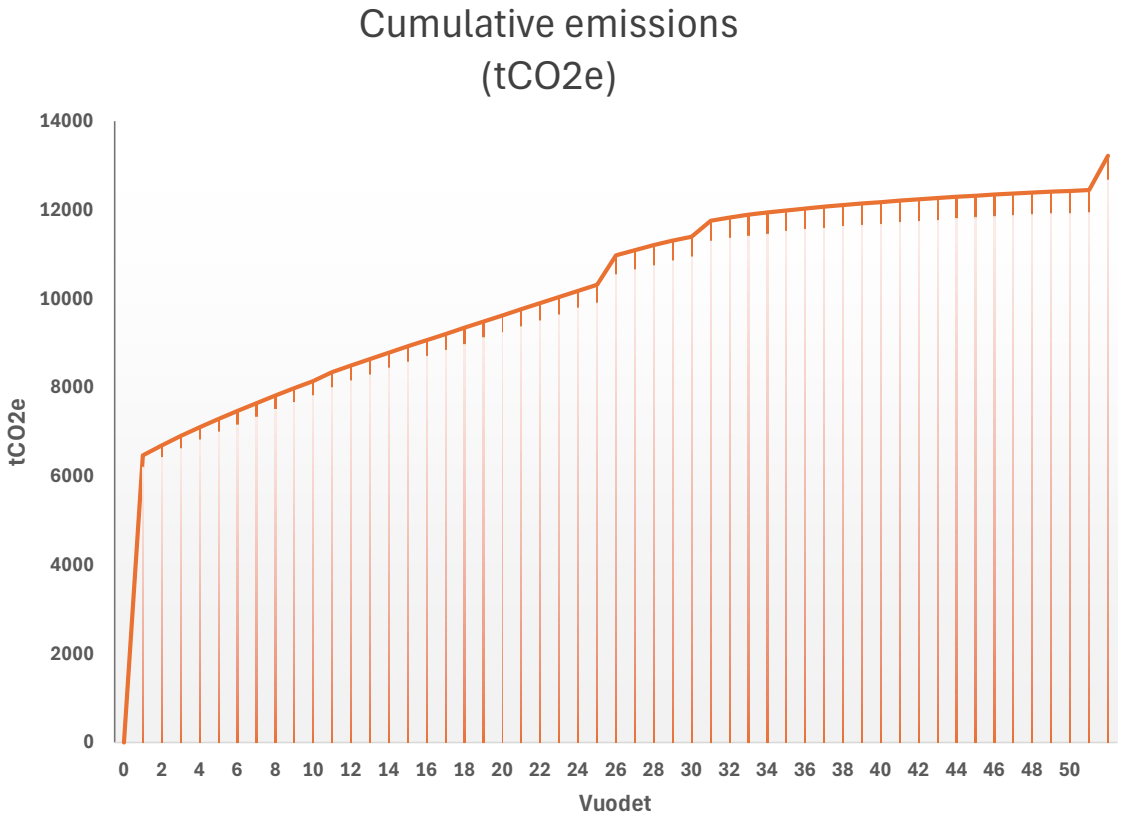
D2 Recovery

D3 Recycling

Example: hospital project whole life carbon emissions (Finland)

The building materials account for majority of the impacts over the life cycle.





Example building, hospital, 50 years service life, Finnish national whole li

Construction project sustainability drivers

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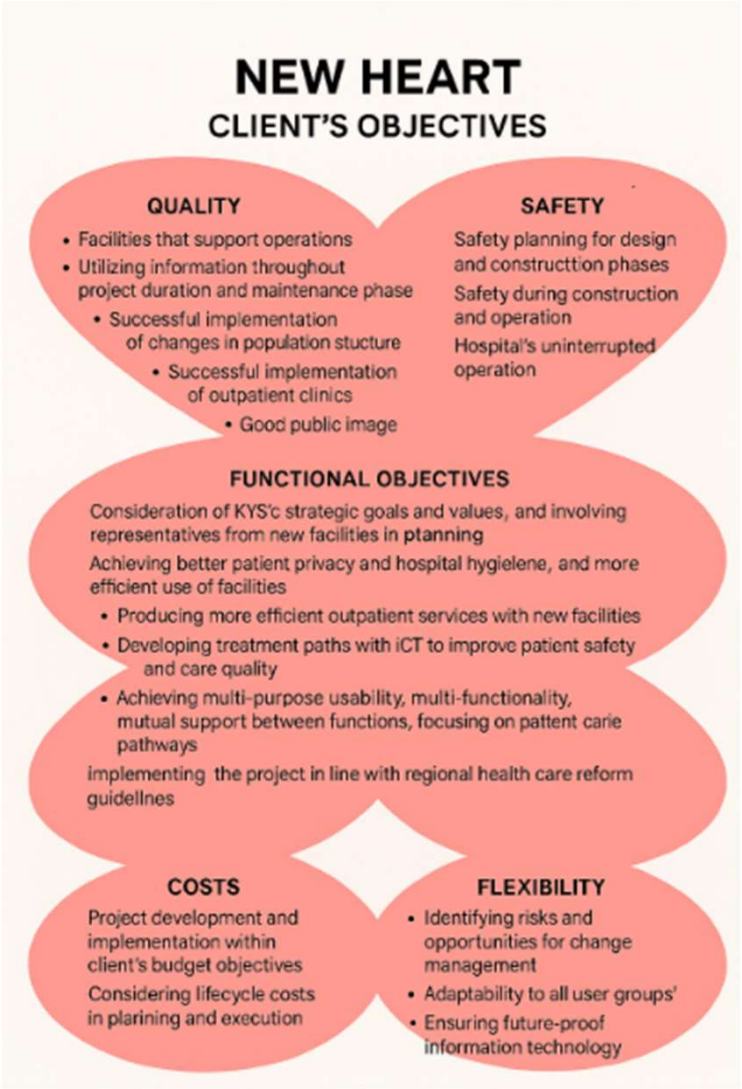

Construction project sustainability drivers

New Heart hospital

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Goals of the Bothnia High5 Project

- **Customer-Centered Design**
  - Build healthy facilities and a safe environment for both patients and staff.
  - Provide the best customer experience in a hospital setting in Finland.
- **Centralization of Services**
  - Integrate specialized healthcare, primary care, and social services under one roof.
  - Enable efficient and flexible service delivery from a single location.
- **Smart and Adaptable Hospital**
  - Design a smart, flexible, and multi-purpose building.
  - Prepare for future technologies and evolving customer needs.
- **Cost Efficiency and Sustainable Lifecycle**
  - Focus on manageable maintenance and modification costs.
  - Ensure long-term cost-effectiveness and sustainability.
- **High-Quality Planning and Construction**
  - Identify and implement the most functional solutions within the agreed schedule.
  - Ensure uninterrupted hospital operations during the construction phase.
- **Accessibility and Inclusivity**
  - Create an accessible and equitable environment for all users.
- **Clean Indoor Air and Healthy Spaces**
  - Construct according to P1 cleanliness classification.
  - Aim for indoor climate class S2 for optimal air quality.
- **Utilization of Digitalization**
  - Use remote connections and digital solutions to bring services closer to patients, regardless of their municipality.

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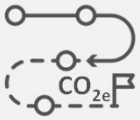
Low-carbon construction requires guidance throughout the project design and implementation

Decisions impacting whole life carbon are made throughout the project

1.

PROJECT INITATION



Organizational strategic objectives

Assessment of carbon footprint of design alternatives

2.

PROJECT PLANNING

Project-level carbon targets

Definition of project goals

3.

GENERIC PLANNING

Guidance for low-carbon design

Design that fulfills project goals and regulations

4.

IMPLEMENTATION PLANNING

Guidance for product and equipment selection

Detailed material, equipment, and product selection

5.

CONSTRUCTION

Environmental guidance for the construction site

Guidance and verification of construction and procurement goals

6.

USE OF THE BUILDING

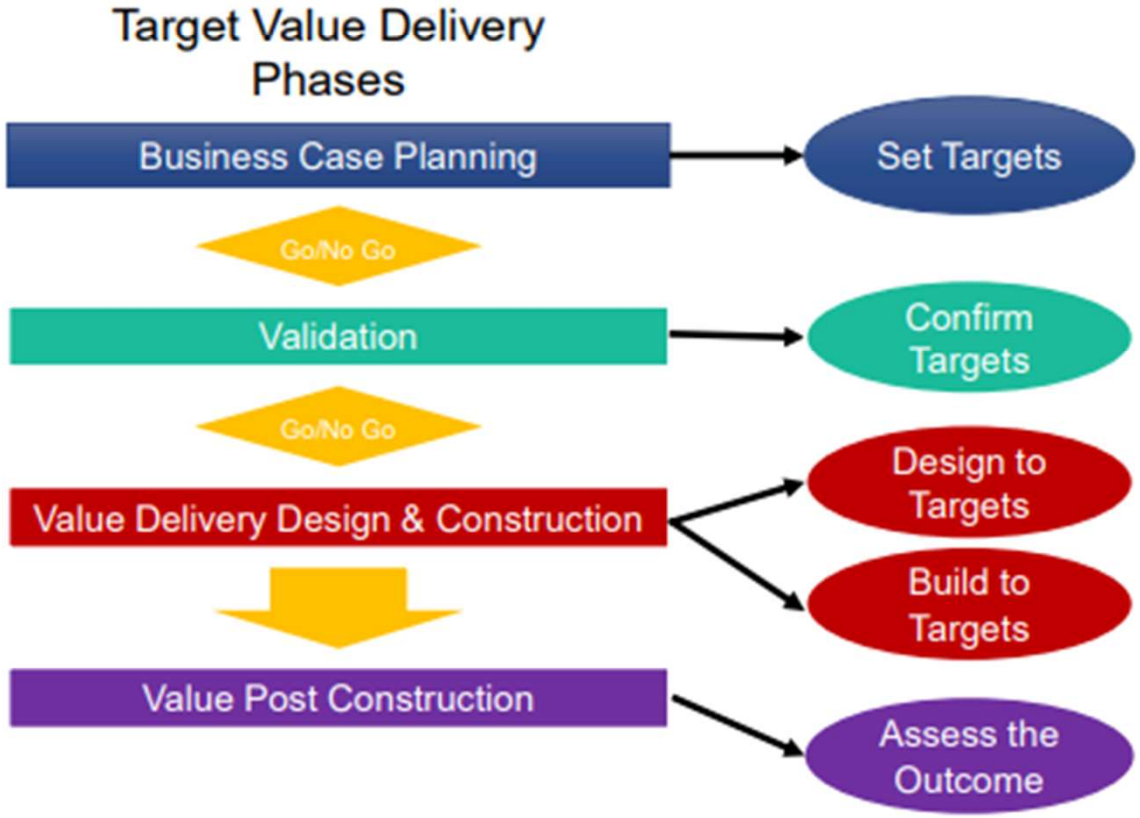
Sustainability strategy for use

Guidance for sustainable use of the property and annual monitoring

TVD Phases Overview

Lean Construction Institute
Immersive Education Program

Targets may include cost, time and quality as defined by the Value Definition



Sustainability in hospitals

Case Laakso hospital

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Laakso hospital project

Largest hospital project in Finland

- Retrofit of 3 old hospital buildings
- 180 000 m^2 of new hospital buildings

- Psyciatric hospital for all ages
- Somatic hospital
- Forensic psyciatric hospital
- Out-patients' departments

Integrated Hospital Design Alliance

Objectives of the Laakso Joint Hospital (LYS) Project

High-Quality Care and Work Environment
Create a safe and health-promoting environment for both patients and staff.
Ensure a high standard of care and working conditions.

Efficient and Flexible Facilities
Design adaptable spaces that can serve multiple purposes.
Promote efficient use of facilities, including shared spaces and high utilization rates

Participation and Operational Models
Involve experience expert and staff in the planning process.
Implement smooth and disruption-free alliance–based operational models

Patient Experience and Care Pathways
Deliver an excellent patient and customer experience.
Enable seamless care pathways, integrating psychiatric and somatic treatment.

Urban Image and Architecture
Contribute positively to the urban landscape with high-quality architecture
Minimize disruption to the surrounding environment during construction.

Sustainability and Lifecycle Management
Prioritize energy efficiency and smart energy solutions, exceeding regulatory requirements.
Address lifecycle and environmental aspects. including carbon footprint calculations, reuses of demolition materials, and use of renewable energy

Construction project sustainability drivers

Laakso Joint Hospital (LYS) Project

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Maximizing value for owners with TVD

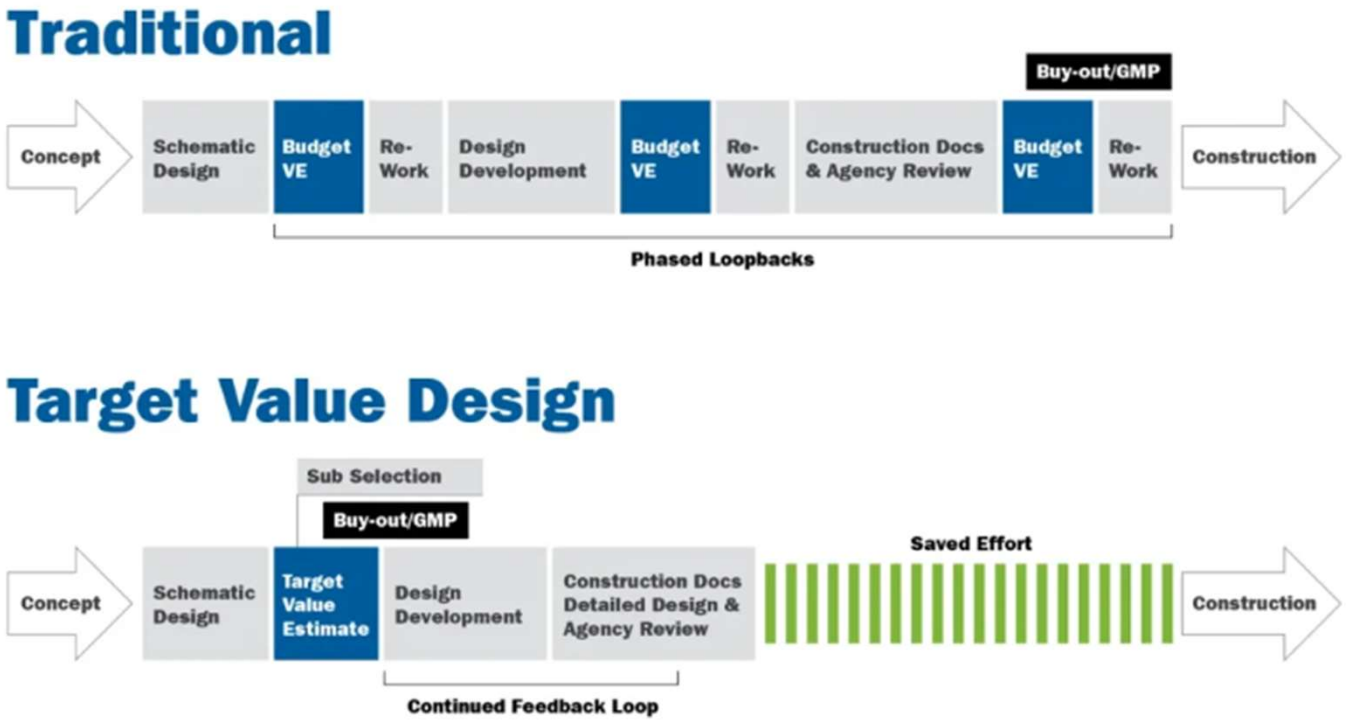

Image via DPR Construction

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LYS Alliance Key Result Areas and Their Objectives

Excellent Organizational Performance
A unified organizational culture based on shared values, enabling top-tier performance and continuous improvement. Strong mutual trust, respect, collaboration, and sense of belonging among personnel.

Unified and Fully Optimized Delivery System
A fully optimized and predictable delivery system, including:

- Scheduling system
- LSH design process for the LYS project
- Integration of subcontractors
- Operational models for site services and logistics
- Situational awareness provided by the delivery system
- Daily management practices
- Quality management model
- Continuous improvement

Responsible and Ethical Operations
Consideration of lifecycle responsibility (Environment, Social, Governance – ESG) in design, construction, and maintenance.

Alignment with Owners' and Operational Needs
Involvement of owners and operational representatives to ensure value creation and a high-quality outcome. Aiming to generate value for owners, future hospital staff, patients, and customers during and after the project.

Minimization of Disruptions
Minimizing disturbances to surrounding stakeholders, such as the operating hospital in the area, nearby residents, and people moving through the area.

High Safety Culture
A safe and healthy environment for workers and surrounding stakeholders.

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Energy savings
Carbon footprint

-20 % energy demand compared to average new hospital project in Finland

30 % energy efficiency improvement through retrofits

-65 % carbon footprint compared to average new hospital project in Finland

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Case Laakso

Energy demand of a small community

Heating energy demand over 20 000 MWh

Cooling energy demand over 8 000 MWh

Electricity demand over 30 000 MWh

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Heating and cooling energy system

Scenario: Geothermal heat

Solar panels

Heat recovery
- Local ventilation
- Wastewater heat recovery

Cooling

Compressor cooling or district cooling

Peak cooling power

- Mortuary
- ICT premises
- Transformer substation and machinery premises
- Telecommunications and safety device premises
- Imaging devices
- Compressed air
- Ventilation
- Facility cooling
- Kitchen premises

Condensate heat of cooling systems is utilised as a heat source using heat pumps. Simultaneously, the heat pump generates most of the required cooling energy.

Direct recycling of condensate heat

Heat pump
Lower temperature level

Heat pump
Higher temperature level

Heating

Low temperature network 1
- Parking garage
- Other semi-heated premises
- Snow melting

Low temperature network 2
- Ventilation
- Floor heating
- Chilled beams for heating

Low temperature network 3
- Hot water
- Ceiling panels for heating

The utilisation potential of waste heat is the highest in low temperature networks

Geothermal heat

Geothermal heat pump

District heating

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Thank you!

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