How Lab Planning Should lead the Discussion on Sustainability and Integrated, Durable and Sustainable Planning Process that Endures

by
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Learning Objectives

1. Learn about the DGNB/EGNATON system that reconsiders the design, construction and operation of flexible and sustainable laboratory environments.

2. Identify design processes and opportunities that lead to enduring sustainability.

3. Investigate the design potential and benefits of continuous assessment strategies.

4. Learn how sustainable laboratory operations can continually support the changing face of sustainable management, minimize maintenance costs and maximize safety.
Egnaton, e.V. and DLR Group

How Lab Planning Can Lead the Discussion on Sustainability Towards an Integrated, Durable and Sustainable Planning Process

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Course Description

Coupled with the fact that Climate Change is reshaping how we build cities, science campuses and communities also move permanently forward. There is no slowing down to consider, there is no stopping because it is inherent to scientific endeavor to realize new possibilities. As lab planners and designers, we want to lead those conversations about what the built environment can be by acknowledging and embracing the impacts that climate change will continue to have on our world. While various certification systems provide a structure and ensure comparability through tenancy, the occupants of the building are the key to successful implementation to the planned sustainability level by either boycotting or embracing the solutions. Durable sustainable planning processes that includes the operation and maintenance side are therefore crucial to the subsequent design of the building.
1. Sustainability with Respect to Laboratories
2. Lab Planner as Driver of Sustainability
3. Focus on Health and Safety – intrinsic Lab Safety
4. Sustainable Planning Process
Sustainability with respect to Laboratories

- Major Goals
- Definitions and Aims
- The Reference Building
- Measures for Improvement of the Standards
We want to design a building that provides:

❖ Sustainability in the common sense by
❖ Safe workplaces - intrinsic lab safety
❖ Efficiency – enhancing technical constraints
❖ Physical comfort
❖ Efficient work flow

with the help of
❖ A sustainable design process
❖ Sustainable construction
❖ Sustainable instruments and equipment

To
❖ Develope sustainable substances and processes

Sustainable Research Requires Sustainable Labs
Sustainable Lab Planning
Sustainability with respect to Laboratories - Buildings

Definitions and Aims

Assessment Criteria and Valuation Method

Sustainability is:
Balance of

Planning Process 16.25%
Socio-cultural Quality 22.5%
Ecological Quality 22.5%
Economical Quality 22.5%
Technical Qualit. 16.25%

Comparability
Sustainable Lab Planning
Sustainability with respect to Laboratories - Instruments/Equipment

Definitions and Aims

Assessment Criteria and Valuation Method

Sustainability is:

Balance of

Human Factors 22.5%
Ecological Quality 22.5%
Economical Quality 22.5%
Technical Qualit. 16.25%
Manufacturing Process 16.25%

Comparability
How ... should one certify such a job!!

- hundreds of building types
- Dozens of disciplines
- Energy consumers without end
- Hazardous substances
- Changing processes and teams
- Load ranges unspecific
The Reference Building

Agree on Systems and follow

- 1st step
  ✓ Determine needs and demand of user

- 2nd step (reference building)
  ✓ Determine common building standards and state of the art solutions

- 3rd step (design process)
  ✓ Improve

- 4th step (audit)
  ✓ Evaluate improvement only
Sustainable Lab Planning
Sustainability with respect to Laboratories

Measures for Improvement of the Standards

❖ Life Cycle Cost
  ✓ $ per unit/cycle/sqft
❖ Emissions
  ✓ weight/volume/temperature/power
  ✓ reusage
❖ Sociocultural
  ✓ Wellbeing
    o Space
    o Temperature
    o Humidity
  ✓ Communication
    o Rooms
    o Furniture, equipment
  ✓ Safety
    o Intrinsic safety
    o Emergency situation

❖ Technical Quality
  ✓ Performance
❖ Planning/Manufacturing Process
  ✓ Teambuilding
  ✓ User integration
  ✓ Design rules
Lab Planner as Driver of Sustainability

- Decision Makers
- Design Process
- Motivation
Communication!!!

Client – Architect
Architect – User
Architect – Subplanner
Plannerteam – FM
Plannerteam - Supliers
Architect - Authorities
Agreement on Sustainability Rating System

✓ LEAD, BREAM, DGNB, etc.
✓ Level Platinum, Gold, Silver, Bronze
How do Tasks and Equipment Develop into Working Procedures and Flows?

Problem: Does Uncertainty Overshadow Planning?

Answer: Implement Adaptable Strategies That Enhance Safety
Consider Your Design Process
Motivation

- Responsibility
  - Ecological Footprint
  - Operator Responsibility

- Efficiency
  - LCC

- Ambition

- Research Results

- OHS
How do tasks, work equipment develop, Working procedures and Workflows?

- Planning strategies to absorb uncertainty
- Reduce complexity
- Understand the work
- Diversify perspective
- Consider Subsystems
- Stakeholder Dialogues
Focus on Health & Safety – Intrinsic Lab Safety

- Definitions and Aims
- Responsibilities
- Implementation Strategies
Because of the wide variety of different activities involving a variety of hazardous substances, the laboratory is pursuing an intrinsic safety concept through construction, equipment, procedures, operation and equipment.

The intrinsic safety concept provides comprehensive basic safety for all standard operating conditions in the laboratory.
The main part of intrinsic laboratory safety are the passive (structural-technical) measures. If required, additional active measures (organizational and personal) can be taken.
Sustainable Labplanning

Safety Aspects

Passive Safety Measures

- Service- and Processspace
  - adequate Sizing
  - Minimum Sizes: Standards, Codes

- Containment
  - Separation of Rooms and Buildingareas and Access according Demand

- Escape Ways
  - enough
  - Minimum Requirements: Standards, Codes

- Surfaces
  - Ease of Cleaning
  - Resistance
  - Tightness
  - Physical Properties

Constructive Safety Measures
Responsibilities

Responsibility of Client

The client is basically responsible for the intrinsic safety of the laboratory, even if he delegates the design task.

Responsibility of Planner

The planner is responsible for the tasks assigned to him and must provide the client with complete documentation.

Responsibility of Operator

Legal responsibility for the operation passes to the operator when the building is handed over.
Intrinsic lab safety is the implementation of:

- Operating concept
- Risk forecast
- Safety concept
- Waste concept
- etc.
Create Transparency with the help of structures and rating systems

Only rate the improvement of the state of the art (higher than standard)

Communication with stakeholders

Architect is main driver of sustainability

Focus on intrinsic lab safety with help of concepts
Sustainable Lab Planning Process

Time for Questions?