How actors can implement in practice the General Principles of Sustainability in their buildings and civil engineering projects
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Questions

• Has a **generally accepted sustainability understanding** already emerged in the construction and real estate sector? What is the basis?

• How can sustainable development goals and aspects **be implemented in the design and decision-making processes**?

• How can the **actors** be supported in their decision-making?
Requirement: Commitment & Know how

**Skeptical participant**
Company is highly motivated by CSR...
...but individual is not convinced
Needs clear argument for why

- Aware: 81%
- Considered: 34%
- Involved: 16%

**Leader**
Willing to drive/lead adoption
Believes in the economics, the climate impact and the regulatory incentives
*More specifiers/developers*

- Aware: 87%
- Considered: 46%
- Involved: 22%

**Unengaged**
Very low knowledge levels and
Pessimistic about doability
Unengaged on environmental issues
*More corporate tenants*

- Aware: 45%
- Considered: 13%
- Involved: 5%

**Uninformed enthusiast**
Pessimistic about the economics, the climate impact and the incentives
Doesn’t know how to get involved
Passionate about the environment

- Aware: 72%
- Considered: 21%
- Involved: 5%
Principles!
What kind of Principles????
Sustainable development, as defined by the Brundtland Commission is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

The principles of sustainable development have to be “translated” into practical rules for the building industry and made relevant for buildings.

"... The predominant factor has been the absence of a set of common guidelines that investors can use to assess risks and opportunities fully. The Principles for Responsible Investment respond to this need."

Norwegian Prime-Minister Gro Harlem Brundtland

Kofi A. Annan

1987

2006
1) Each generation must solve its own problems and not burden the next generations with them ….

(2) Renewable natural goods (e.g. wood or fish populations) should, on a long term basis, be used only within the bounds of their ability to regenerate. Equally, non-renewable natural goods (e.g. minerals or fossil energy sources) should only be used to the extent that their functions can be replaced by other materials or energy sources.

(3) The release of materials into the environment should, in the long run, not exceed the adaptability of the eco-system – e.g. the climate, forests and oceans.

(4) Dangers and unjustifiable risks to human health should be avoided.

(5) Structural change triggered by technical developments and international competition should be shaped in a way that is economically successful as well as ecologically and socially sustainable ….

Existing examples: Management rules – II

(6) **Energy and natural resource consumption and the provision of transport services should be decoupled from economic growth.** At the same time, we should aim for growth-related increases in demand for energy, resources and transport to be more than offset by efficiency gains …

(7) Public budgets are to take account of intergenerational equity ….

(8) Sustainable agriculture needs to be compatible with nature and the environment and take into account the requirements of livestock farming in a way that is fair to the animals and provides consumer protection, particularly concerning health matters.

(9) In order to strengthen social cohesion poverty and social exclusion should be prevented as far as possible, opportunities for participating in economic development should be open to all sections of society …

(10) General international conditions should be shaped jointly in a manner which ensures that people in all countries can lead a life worthy of a human being and according to their ideas and in unison with their regional environment while at the same time profiting from economic developments. Environment and development form a unit ….
Existing examples: PRI – responsible investment

The PRI principles developed for the financial sector can also be used in the field of investment in real estate.

https://www.google.de/search?q=principles+responsible+investment+PDF&ie=utf-8&oe=utf-8&client=firefox-b&gfe_rd=cr&ei=aI8mWYXjF87b8Af6_rKgCg
Existing examples: UNEP-FI Sustainability Metrics

For companies in the real estate sector there are guidelines for taking sustainability aspects into account at their various levels of action.

Existing examples: RIBA – “green” Plan of Work

There are already experiences and checklists for the integration of sustainability aspects into the design tasks per work stage.

## Principles – what kind of principles?

<table>
<thead>
<tr>
<th>Principles for sustainable development</th>
<th>PRINCIPLES Management Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles for sustainability assessment of construction works</td>
<td>RULES Assessment Rules</td>
</tr>
<tr>
<td>Principles for responsible investment</td>
<td>TARGETS Commitment</td>
</tr>
<tr>
<td>Principles for integration of sustainability aspects into design and decision making</td>
<td>RECOMMENDATIONS Guideline</td>
</tr>
</tbody>
</table>
Principles!
The contribution of ISO TC59 SC 17

ISO 15392
ISO/TS 12720
One basis for the transfer of the principles of sustainable development into the construction and real estate industry is the international standard series resulted from the work of ISO TC 59 SC17.

The authors of this paper have been and are involved in the development and refinement of these standards.

The contributions from Germany are supported by the Federal Institute for Research on Building, Urban Affairs and Spatial Planning.
ISO TC59 SC17 Sustainability in buildings …

Methodological basics
- ISO 15392: General principles
- ISO/TR 21932: Terminology

ISO 21929-1: Sustainability indicators – Part 1: Framework for the development of indicators and a core set of indicators for buildings

Buildings

Building products
- ISO 21930: Environmental declaration of building products

… a larger set of standards …
ISO 15392:2008 General Principles

• The aim of this International Standard is to set out the objectives for sustainability in building construction and from these derives general principles.

• It forms the basis for deriving evaluation criteria and indicators for the assessment of the contribution of buildings to sustainable development, and it enables decision makers to apply the principles in their decision making.

The meaning of “sustainable development …”

• Sustainable development of buildings and other construction works brings about the required performance and functionality with minimum adverse environmental impact, while encouraging improvements in economic and social (and cultural) aspects at local, regional and global levels.

• The contribution of buildings and construction works to sustainable development can be considered on several levels, including a whole industrial sector, an enterprise, a community, a building stock, a group of buildings, or an individual building or construction works.
The meaning of “sustainability assessment …”

- Addressing sustainability in buildings and other construction works includes the interpretation and consideration of sustainable development in terms of its three primary aspects – economic, environmental, and social aspects – while meeting the requirements for technical and functional performance of the construction works.

- These aspects are inextricably linked to each other and interdependent, and a dynamic balance exists between them, .... They have no particular precedence and this International Standard gives them equal importance.
ISO/TS 12720:2014 Guideline for the application

• ISO/TS 12720:2014 provides guidance for the application of the general principles of sustainability in buildings and civil engineering works elaborated in ISO 15392.

• It provides a step-by-step approach for: encouraging the application of the general principles by all stakeholders at each stage of the project and its use, helping interested parties to consider and/or incorporate sustainability thinking in all phases of the building's or civil engineering works' life cycle …

https://www.iso.org/standard/51654.html
Decision making along the physical life cycle

Parallel to the physical life cycle forming the basis for energy and mass flows (and cash flow), project management takes place dealing with the flow of information, the fulfillment of responsibility towards the environment and society as well as the consideration of current and future effects of decisions.
The “areas of protection” / “areas of concern” can be used a basis for deriving objectives and assessment criteria for sustainable development in the construction sector. They can also be used for deriving related social and economic aspects.
## Dimensions of sustainability & Areas of concern

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Areas of concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Dimension</td>
<td>Economic resources / LCC Asset / property value</td>
</tr>
<tr>
<td>Environmental Dimension</td>
<td>Environment / Ecosystem (natural) Resources</td>
</tr>
<tr>
<td>Social Dimension</td>
<td>Social infrastructure Cultural heritage / cultural value Human health and comfort</td>
</tr>
</tbody>
</table>
Process-related principles (Recommendations)

- Continual improvement
- Equity
- Global thinking and local action
- Holistic approach
- Involvement of interested parties
- Long-term consideration
- Precaution and risk management
- Responsibility
- Transparency
Principles!
The details ......
Recommendations (principles) in detail - I

The concept of sustainability implies the **equal consideration of all three pillars** of sustainability. This is vital to **reflect the entire impacts** of building and construction works rather than focusing on a single criterion (e.g. GWP).

Global aims and concerns with respect to sustainable development need to be aligned with needs, requirements and constraints with respect to **functionality** and efficiency (e.g. cost-benefit ratio).
To benefit from sustainable development concepts, **long-term considerations** are an important factor during inception and design of a project.

**All life cycle stages** have to be taken into account to assess the **implications of a decision taken on other life cycle stages**.
Recommendations (principles) in detail - III

Management strategies need to be set up and communicated to identify, analyze and control any potential risks.

Risks may be avoided by using methods, techniques and products that are proven to be safe and healthy (precautionary principle).
## Life cycle stages (ISO TS 12720)

<table>
<thead>
<tr>
<th>Decision-making process</th>
<th>Questions raised</th>
<th>Main stakeholders (or actors)</th>
<th>Result/deliverables</th>
</tr>
</thead>
</table>
| Strategic planning     | — What is the demand?  
— What are the needs?  
— What are the sustainability objectives?  
— What are the opportunities and constraints of the site? | Clients, users, community interest groups                                 | — Preliminary objectives  
— Decision to proceed or not                                                          |
| Project definition     | — What are the technical and functional requirements?  
— What are the environmental, economic, and social performance requirements? | Clients, users, community interest groups                                 | — Project detailed objectives  
— Creation of the project/client brief                                               |
| Design                 | How is the demand expressed into a project, first schematically and then in detail? | Designers, engineers, clients, users, regulatory authorities, community interest groups | A sustainable construction project, with detailed drawings and specifications       |
| Construction and handover | How is the design realized and the works handed over to users? | Contractors, suppliers, manufacturers, clients, users | A sustainable construction process, a sustainable works/asset, a user guide, specifications for use |
| Operation and maintenance | How to operate and maintain the built environment in an effective, sustainable way? | Clients, users, facility managers, suppliers, community interest groups | A sustainable service life, including continuous improvement                        |
| End-of-life strategy   | Once full obsolescence is reached, how to deal with the end-of-life, without creating damage to the environment or the community? | Clients, suppliers, contractors, community interest groups | A sustainable exit strategy and its realization, a clean site                       |

### Strategic planning
### Project definition
### Design
### Construction
### Handover
### Operation / maintenance
### End of life

**Questions**

**Actors**

**Results**
Objectives – aspects (dimensions) - principles

In ISO TR 12720 both sustainability dimensions (aspects) and principles (recommendations) are assigned to the different sustainability objectives.

<table>
<thead>
<tr>
<th>Sustainability objectives and related issues of concern</th>
<th>Aspects</th>
<th>General principles of sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Environmental</td>
<td>Economic</td>
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<tr>
<td>A1 — Establishment of the sustainability policy of the client or main decision-maker and communication of the vision</td>
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<td>A2 — Availability of resources (e.g. financial, technical, human, etc.)</td>
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<td>A3 — Implementation of an integrated multidisciplinary approach throughout the process</td>
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<td>A4 — Adoption of an iterative process and validation of the choices at each key stage</td>
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<tr>
<td>A5 — Management of risks</td>
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</tbody>
</table>
Principles!
Outlook and conclusions
Revisions under consideration

The inclusion and consideration of additional topics is currently under discussion

- Sustainable development goals (SDG‘s)
- Handling of multiple impacts
- Impact chains
- Resilience
- Integrated design
- Smart buildings
- Building information modelling (BIM)
- Regenerative sustainability
Conclusions

• All aspects of sustainable development have to be adapted to the concrete object of assessment (buildings, construction sites, neighborhoods, cities) and the specific work task.

• Local and cultural characteristics shall be taken into account.

• All aspects must be integrated into the design and decision-making processes as well as the work and responsibilities of relevant actors.

• It is no longer appropriate to distinguish between traditional work tasks and additional tasks concerned with sustainability issues.
Thank you