HOW TO MEASURE SUSTAINABILITY?

THE ASSESSMENT OF SUSTAINABILITY IN CONSTRUCTION AND ARCHITECTURE

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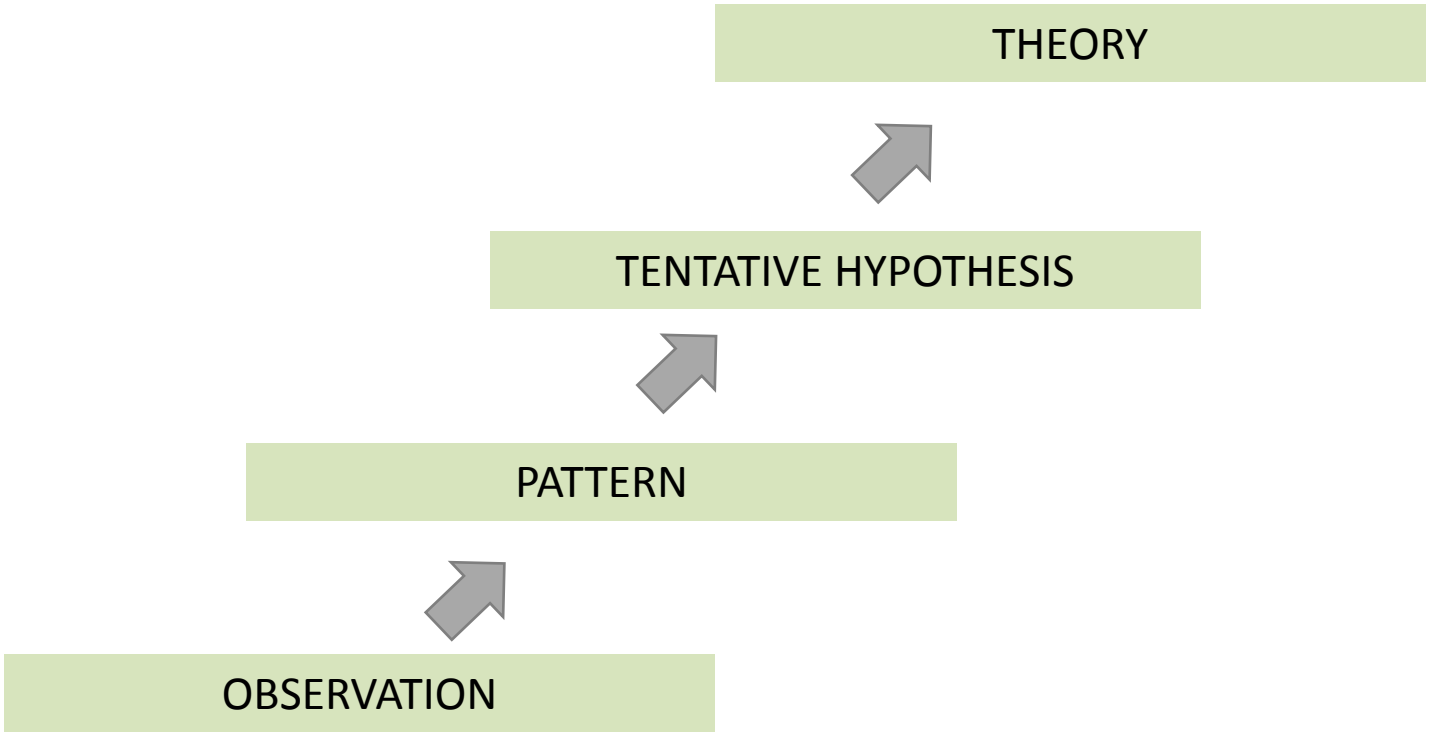
INDUCTIVE METHOD

TOWARDS A THEORETICAL MODEL FROM OBSERVATIONS



DEMAND FOR THE CONCEPT OF SUSTAINABILITY
A GLOBAL AGENDA FOR CHANGE

WHAT WERE THEY ASKED TO DO?

"A global agenda for change"- this was what the World Commission on Environment and Development was asked to formulate. It was an urgent call by the General Assembly of the United Nations:

*· to propose **long-term environmental strategies** for achieving sustainable development by the year 2000 and beyond;*

*· to recommend ways **concern for the environment may be translated into greater co-operation** among developing countries and between countries at different stages of economical and social development and lead to the achievement of common and mutually supportive objectives that take account of the interrelationships between people, resources, environment, and development;*

*· to consider ways and means by which the **international community can deal more effectively with environment concerns;** and*

*· to help define shared perceptions of **long-term environmental issues** and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long term agenda for action during the coming decades, and aspirational goals for the world community.*

Our Common Future – Chairman's Foreword

UN Documents: Gathering a Body of Global Agreements has been compiled by the *NGO Committee on Education* of the *Conference of NGOs* from United Nations web sites with the invaluable help of information & communications technology.

SUSTAINABILITY IN CONSTRUCTION
METHODS FOR EVALUATION

ASSESSMENT OF SUSTAINABILITY

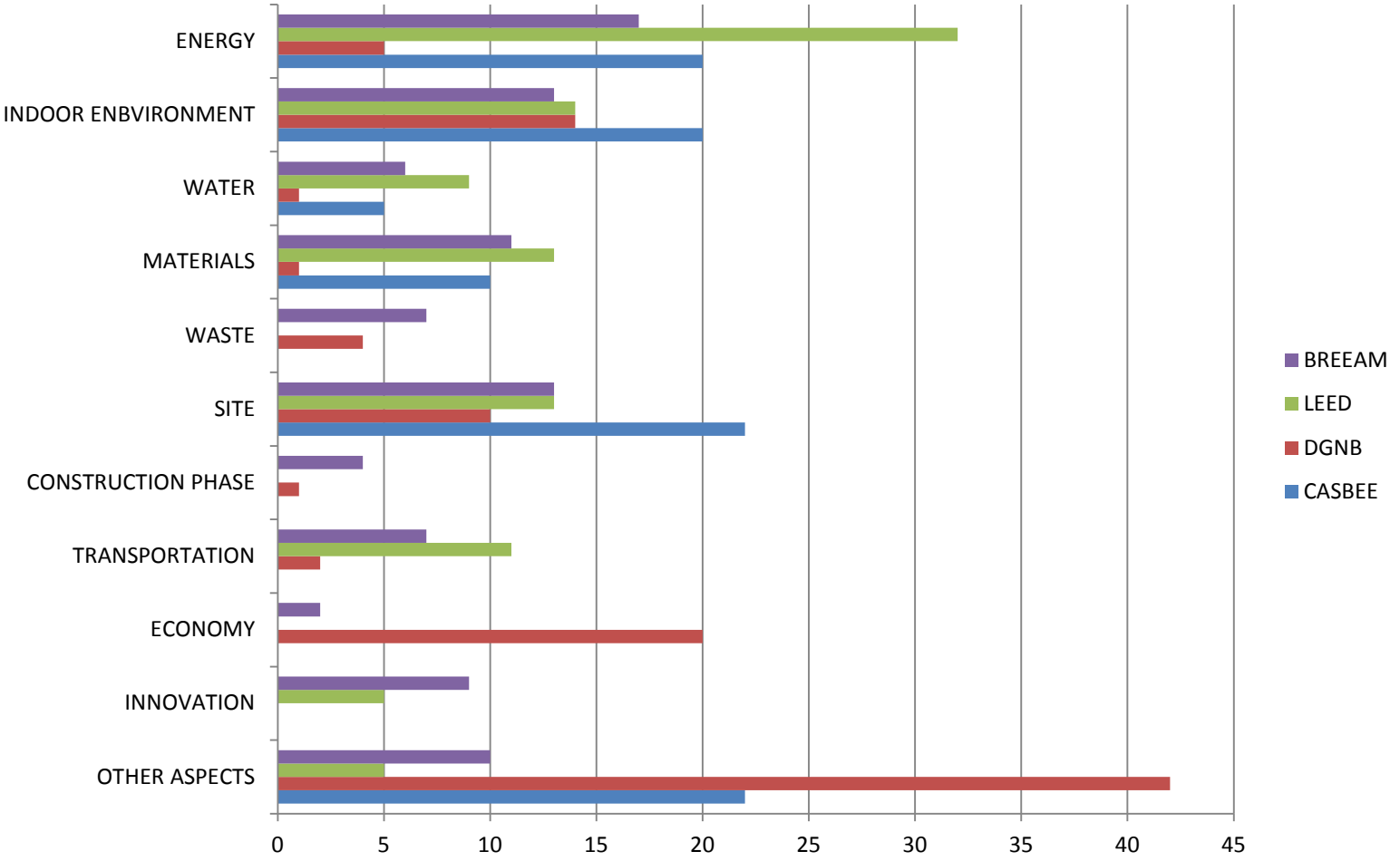
BREEAM UK 1990
BRE Environmental Assessment Method

LEED US 2000
Leadership in Energy and Environmental Design

CASBEE Japan 2001
Comprehensive Assessment System for Built Environment

DGNB Germany 2007
Deutche Gesellschaft für Nachhaltiges Bauen

BREEAM, LEED, DGNB or CASBEE?



SOURCE: Olsson, Daniel: Wide variation in how parameters are regarded in environmental certification systems. REHVA Journal – May 2013.

STANDARDS ON SUSTAINABLE CONSTRUCTION

ISO *International Organization for Standardization*
EN *European Standards*

- 'Vienna Agreement' between ISO and CEN for parallel development of international standards

→ ISO and CEN have separate standards on sustainable construction - but share the approach on sustainability without major contradictions

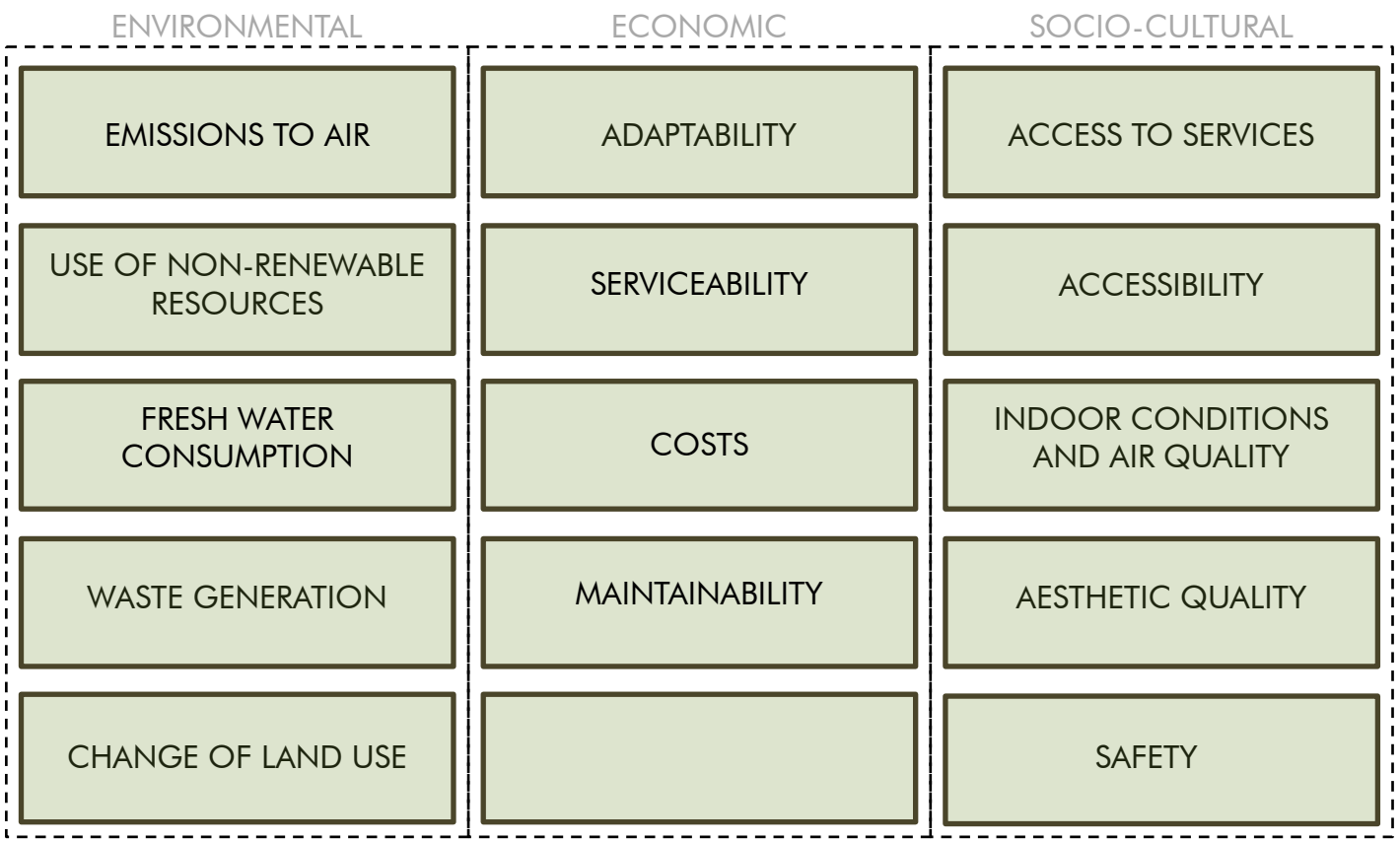
ISO 15392	Sustainability in building construction – General principles
ISO 21929-1	Sustainability in building construction – Sustainability indicators – Part 1: Framework for the development of indicators and a core set of indicators for buildings
ISO 21930	Sustainability in building construction - Environmental declaration of building products
ISO 21931-1	Sustainability in building construction – Framework for methods of assessment of the environmental performance of construction works – Part 1: Buildings
EN 15643-1	Sustainability of construction works – Sustainability assessment of buildings – Part 1: General framework
EN 15643-2	Sustainability of construction works – Assessment of buildings – Part 2: Framework for the assessment of environmental performance
EN 15643-3	Sustainability of construction works – Assessment of buildings – Part 3: Framework for the assessment of social performance
EN 15643-4	Sustainability of construction works – Assessment of buildings – Part 4: Framework for the assessment of economic performance
EN 15804	Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

STANDARDIZATION

- The aim of international standardization is **to harmonize** and **to create shared understanding**
- Benefits
  - Global applicability
  - Independency of commercial rating systems
  - Holistic approach on sustainability
  - Aspects of sustainable construction are clear and understandable
  - Assessment methodology guidelines (indicators) are clearly described

THE SUSTAINABILITY FRAMEWORK

ASPECTS OF SUSTAINABLE CONSTRUCTION AS IN ISO 21929-1



APPLYING THE ISO STANDARD ASSESSMENT IN PRACTICE


United Nations

Report of the World Commission on Environment and Development

Our Common Future

United Nations
1987

LEFT: Suurpelto daycare center, Auer & Sandås arkkitehdit
RIGHT: Leinelä II daycare center, Kimmo Lylykangas Architects & Oy CASE Consult Ab

SYSTEMIC APPROACH

A COMPLEMENTARY ANALYSIS STRATEGY OR AN ALTERNATIVE ASSESSMENT METHOD?

SYSTEMIC APPROACH IN SUSTAINABILITY ASSESSMENT

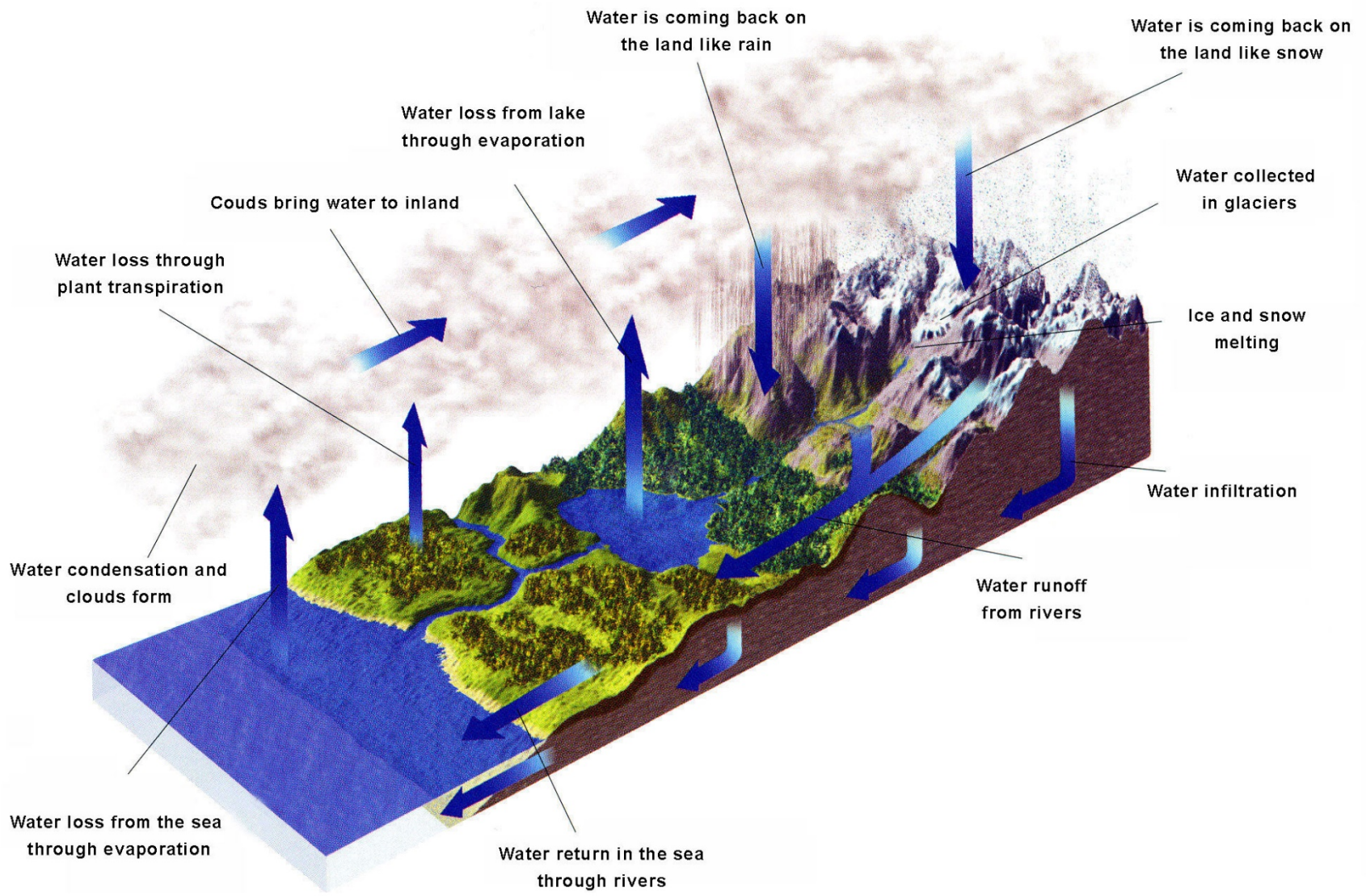
GENERIC LEVEL: THE NATURAL STEP FRAMEWORK

Karl-Henrik Robèrt: *The Natural Step framework* for sustainability

- *”A Science-Based Definition of Sustainability”*
  backcasting approach
  systems thinking
- Respective difference as in **eco-efficiency vs. eco-effectiveness** (Braungart and McDonough)

IMAGE: Lars-Erik Mattila: The Residential Multi-Storey House of the Future.

SYSTEMIC APPROACH IN LANDSCAPE ARCHITECTURE



SUSTAINABILITY ASSESSMENT AND CONTEXT

CONTEXT

The surroundings, circumstances, environment, background or settings that determine, specify, or clarify the meaning of an event or other occurrence

LEVELS OF EXAMINATION

GENERIC (GLOBAL)
SOCIETAL (NATIONAL OR REGIONAL)
SITE-SPECIFIC (LOCAL)

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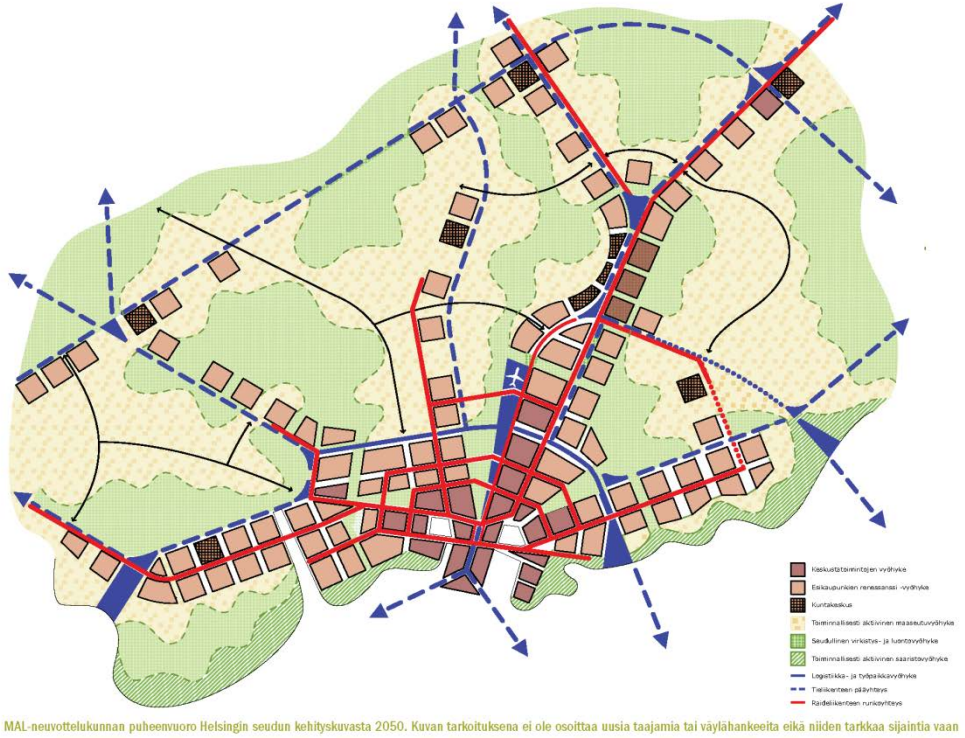
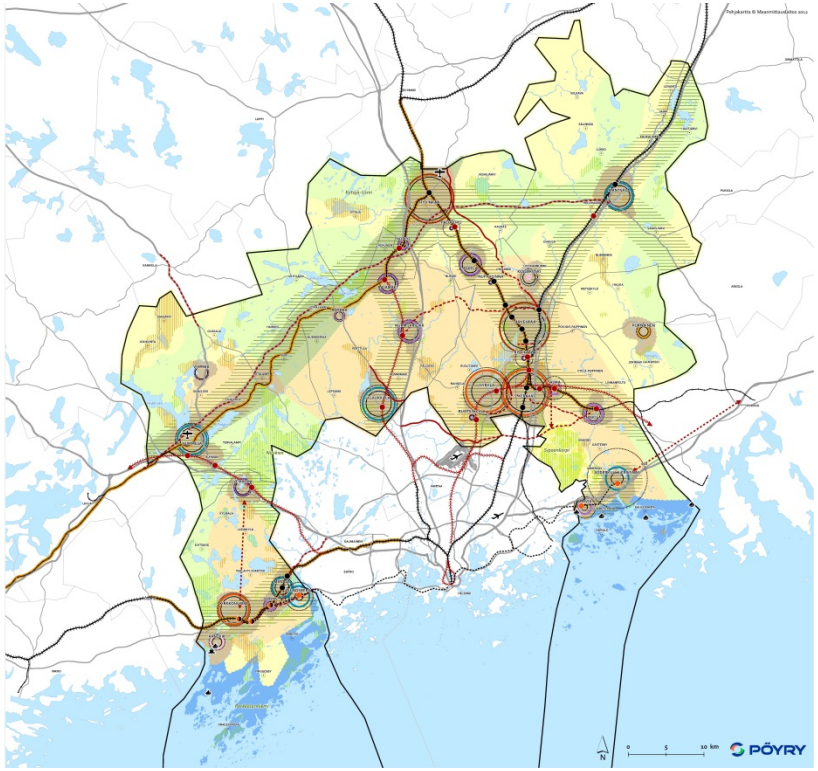
SOCIETAL LEVEL: ZOOM OUT



MAL-neuvottelukunnan puheenvuoro Helsingin seudun kehityskuvasta 2050. Kuvan tarkoituksena ei ole osoittaa uusia taajamia tai väylähankeeita eikä niiden tarkkaa sijaintia vaan



IMAGES: Rajaton Metropoli 2050 – kehityskuva; Kuuma-kuntien kehityskuva 2035.

LOCAL LEVEL: CASE SUNDSVALL

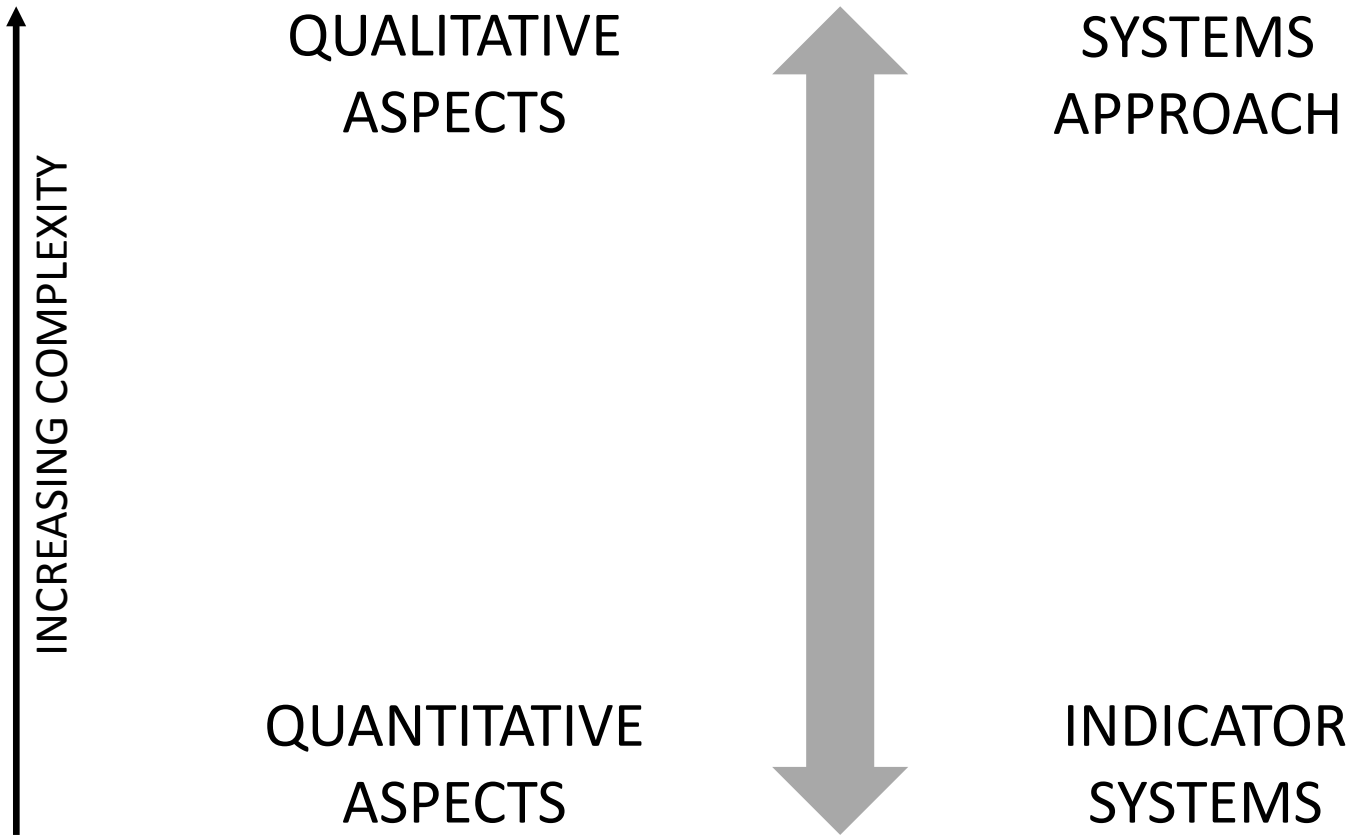
Valokuva: http://gotravelaz.com/wp-content/uploads/images/Sundsvall_29217.jpg

TOP-DOWN

Top down approach starts with the big picture. It breaks down from there into smaller segments.

BOTTOM-UP

In a bottom-up approach the individual base elements of the system are first specified in great detail. These elements are then linked together to form larger subsystems, which then in turn are linked, sometimes in many levels, until a complete top-level system is formed.


INCREASING COMPLEXITY
QUALITATIVE ASPECTS
SYSTEMS APPROACH
QUANTITATIVE ASPECTS
INDICATOR SYSTEMS

SUSTAINABLE ARCHITECTURE?

RESPONSES TO RELEVANT QUESTIONS
BY MEANS OF ARCHITECTURE

HOLISTIC SITE AND CONTEXT ANALYSIS

A SUSTAINABLE NUCLEAR POWER PLANT?

CONCLUDING REMARKS 1 (3)
CAN WE BUILD ON THIS?

- Harmonization of sustainability assessment in is an important step forward in sustainable development and in construction sector
- The break-down of the concept is a projection of what is expected from the built environment in the future
- The concept of sustainability was created to become **a driver for change**: if an assessment cannot identify problems of the current practises, it cannot be viable as a method
- Analytical and performance-oriented *"isolate and measure"* approach based on indicators appears to be too staight-forward to deal with the **complexity** and **diversity** of sustainability challenge

CONCLUDING REMARKS 2 (3)
WHAT COULD BE GAINED BY SYSTEMIC APPROACH?

- Sustainability of building solutions needs to be assessed in the context
- **Systemic approach** could be developed to an **complementary analysis method** or an **alternative assessment method**
- An assessment method based on systemic approach
  - would most likely apply **bottom-up** approach instead of **top-down**
  - would loose the opportunity of benchmarking and comparison of buildings
  - would not operate with performance indicators but could focus on the process
  - could provide the necessary information on local sustainability problematics and relate to context
  - could generate understanding of complex problematics, encouraging for innovative and even radical improvements in current practices

CONCLUDING REMARKS 3 (3)
HOW TO MEASURE SUSTAINABILITY?

Measure what is measurable -

- The accurate figures from performance indicator assessment are useless without understanding of multiple environmental and societal impacts that a building always causes.

THANK YOU FOR YOUR ATTENTION