Reducing the impacts of the built environment through the integration of socio-economic indicators in certification standards

École de technologie supérieure

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International Co-owners: SBE SERIES iiSBE Sustainable Buildings and Climate Initiative FIDIC Global Alliance for Buildings and Construction

Integrating socio-economic aspects in the **CASBEE-UD**

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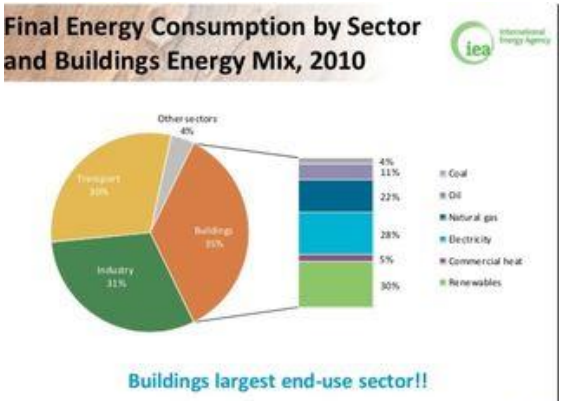
The Problems

Construction industry uses globally about

- **40%** of energy
- **40%** of natural resources (raw materials and other materials)

and

- produces **25%** of waste



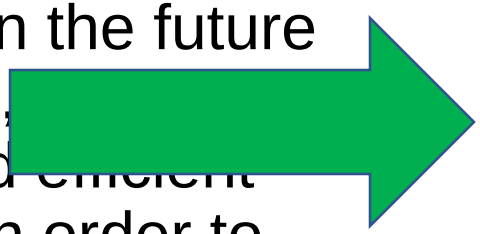
[Ref. World Commission on Environment and Development (WCED), European Commission, 2009]

The Deliverable

- Our research is guided by the development of an appropriate methodological approach based on the integration of socio-economic aspects to the CASBEE-UD standard

The goal

- The goal is that the knowledge of the certification standards should help in the future development, complete and efficient certification in order to have a tool based on strong sustainability criteria "triple bottom line"



- The aim of this study is to develop additional indicators to those existing in the certifications of tools to assist planners and citizens to improve the assessment of the built environment (neighbourhoods)

New methodologies for a more sustainably built environment

- Several communities and institutions have developed **new methodologies** for monitoring the sustainability status of their cities
- Some communities have launched tools to ensure that the hardware requirements of their cities strive towards sustainability

Certification standards: several weaknesses

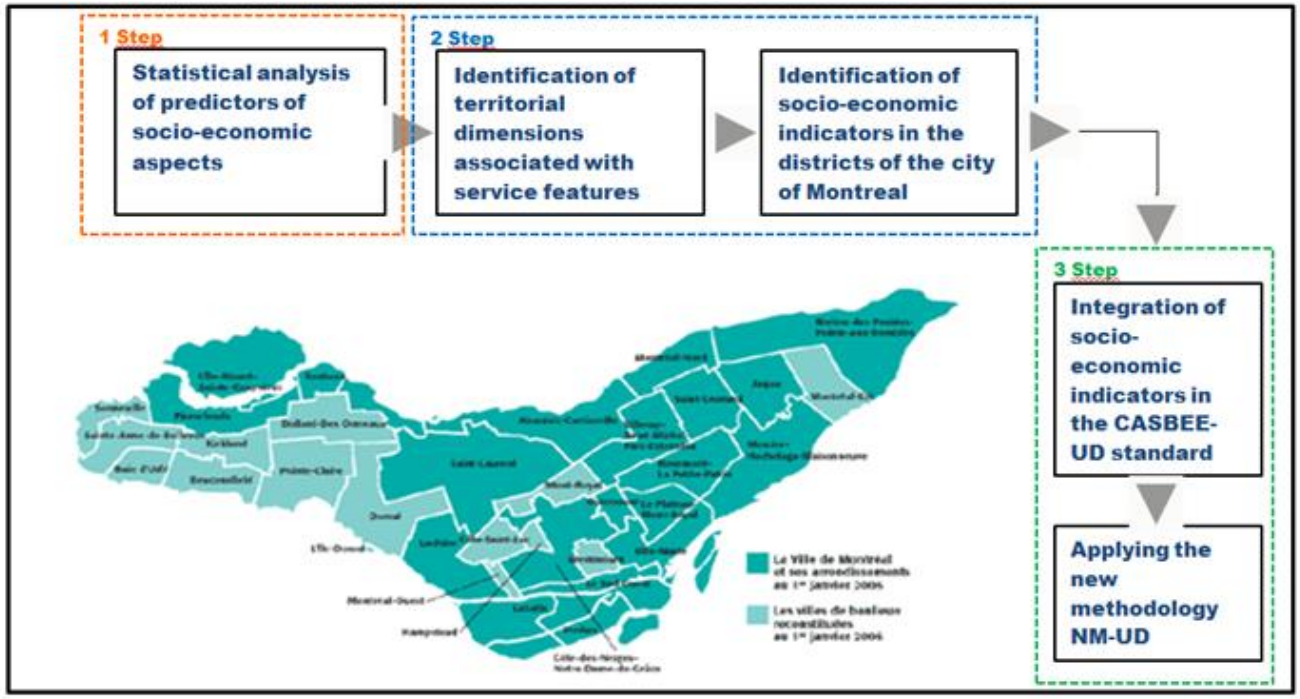
- All these standards are developed at the neighbourhood level. Certification standards mentioned above are the most known and used, but several weaknesses especially the socio-economic aspects.

- It is necessary to develop clear objectives and effective sustainability criteria
- It is necessary to understand and analyze existing certifications, specifically the criteria, which structure and guide the entire evaluation process

The most significant weaknesses

- 1. The extent of sustainability (or sustainability);
- 2. The inclusion of prerequisites;
- 3. Adaptation to the locality;
- 4. The participation of stakeholders and citizens;
- 5. Placement of the actors in the project phases;
- 6. The presentation of results;
- 7. The application of the standard to different contexts

The methodological approach

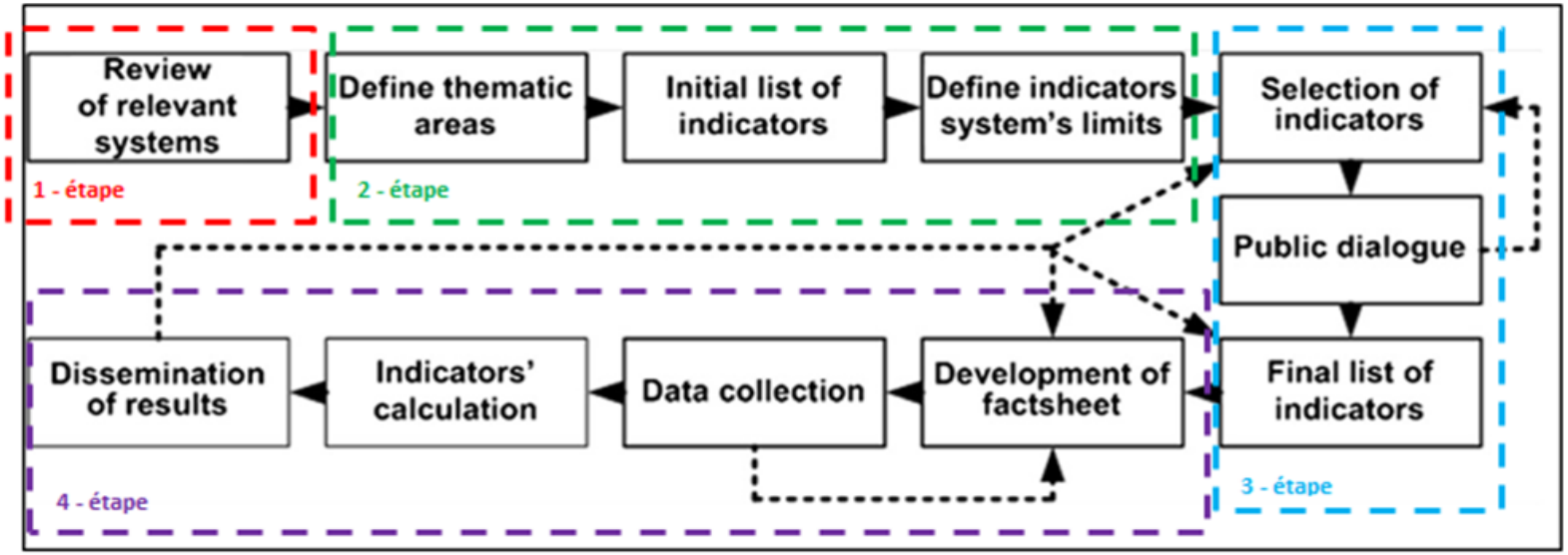


- First step - engage citizens in an urbanization project and to use methods to help communities develop a list of indicators
- Second step - the propose approach will be based on the use of geographic information systems (GIS) to study urban form

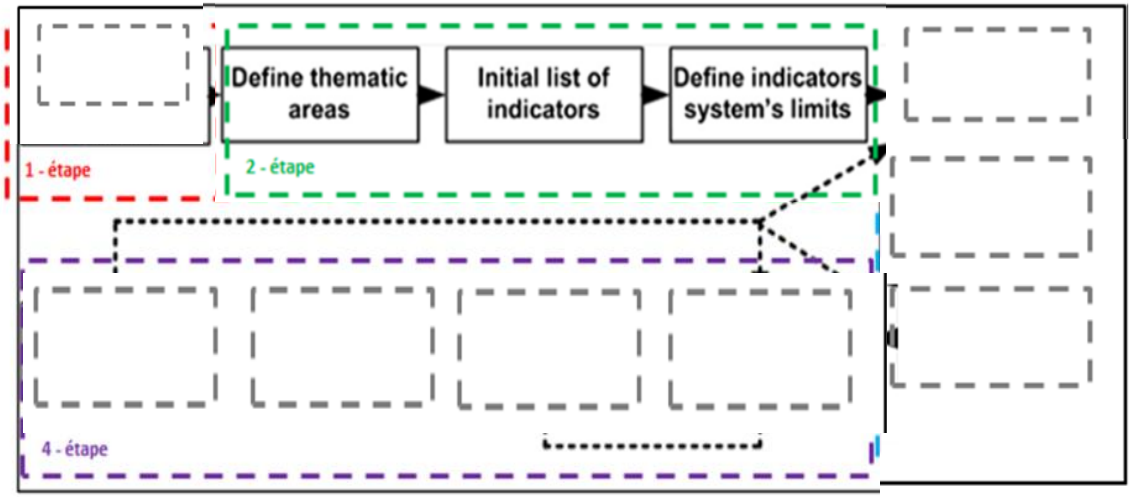
- In the same step, socio-economic and territorial indicators of each selected neighborhood will be identified.

- In the third step, socio-economic and territorial indicators will be integrated into the CASBEE-UD standard and the new standard will be applied to the selected territory

First step



- Selection criteria to analized to measure the sustainability
- Initially chose to take the data that were used by the boroughs of Ahuntsic-Cartierville, Plateau Mont Royal, Sud-Ouest and Lachine to test the methodology through a statistical evaluation


Define thematic areas
Initial list of indicators
Define indicators system's limits
1 - étape
2 - étape
4 - étape

First step

- The choice of these districts was made to combine each district (eg. economics) in order to create a better sample.
- For this assessment a statistical analysis is used for research of independent variables.
- testing the results of these four districts, the analysis will be extended to all districts of Montreal for the assessment to be statistically representative.
- it was found that there are differences between the criteria selected by the standards and those used by the boroughs.

The final list

Equitable social value and social responsibility	Strengthening cohesion and social equity	Accessibility
		Public spaces
		Density
		Distribution of services
		Inclusion
		Security
	Enhancement of architectural heritage (buildings and materials) and historical (preservation of historical memory)	Structure
		Materials
		Technology
		Protection
		Care and maintenance
		Form
		Architectural fragmentation
		Architectural quality
Economic strategy	Cost reduction	Waste management
		Distribution of functions
		Use - activity
		Contiguity
	Increased cohesion (accessibility and transport) and economic dynamic (jobs and enterprises)	Streets frame
		Public transport
		Ease of movement
		Traffic flow
		Parking
		Link, connection
		Economic diversification
	Multi-functionality of the territory, territorial competitiveness	Location
		Connection
		Partition areas
		Urban frame
		Public areas
		Historical activities

In this first stage, it was noted that there is an absence of territorial criteria in the characterization of citizen satisfaction.

So the next step in an analysis of the territory will be carried out to identify the missing criteria.

Second step

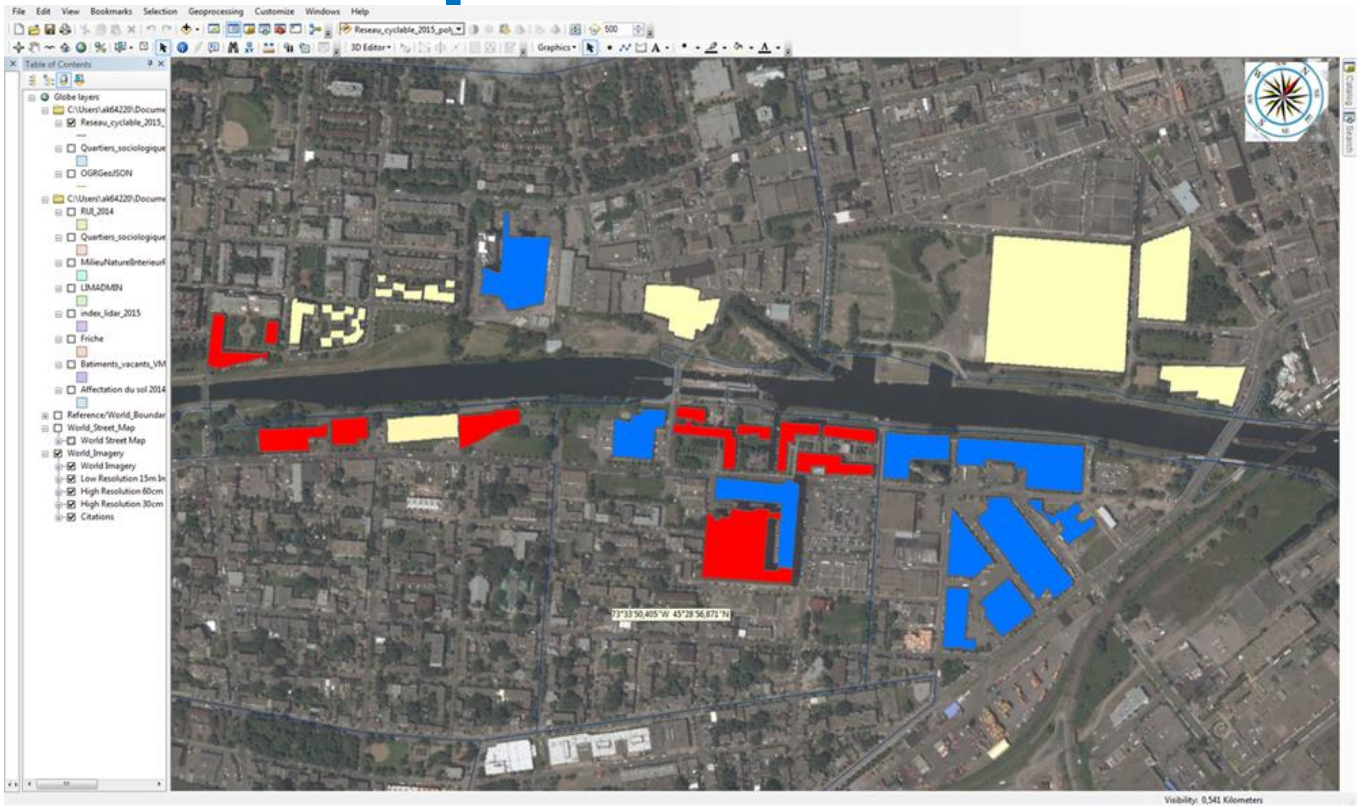

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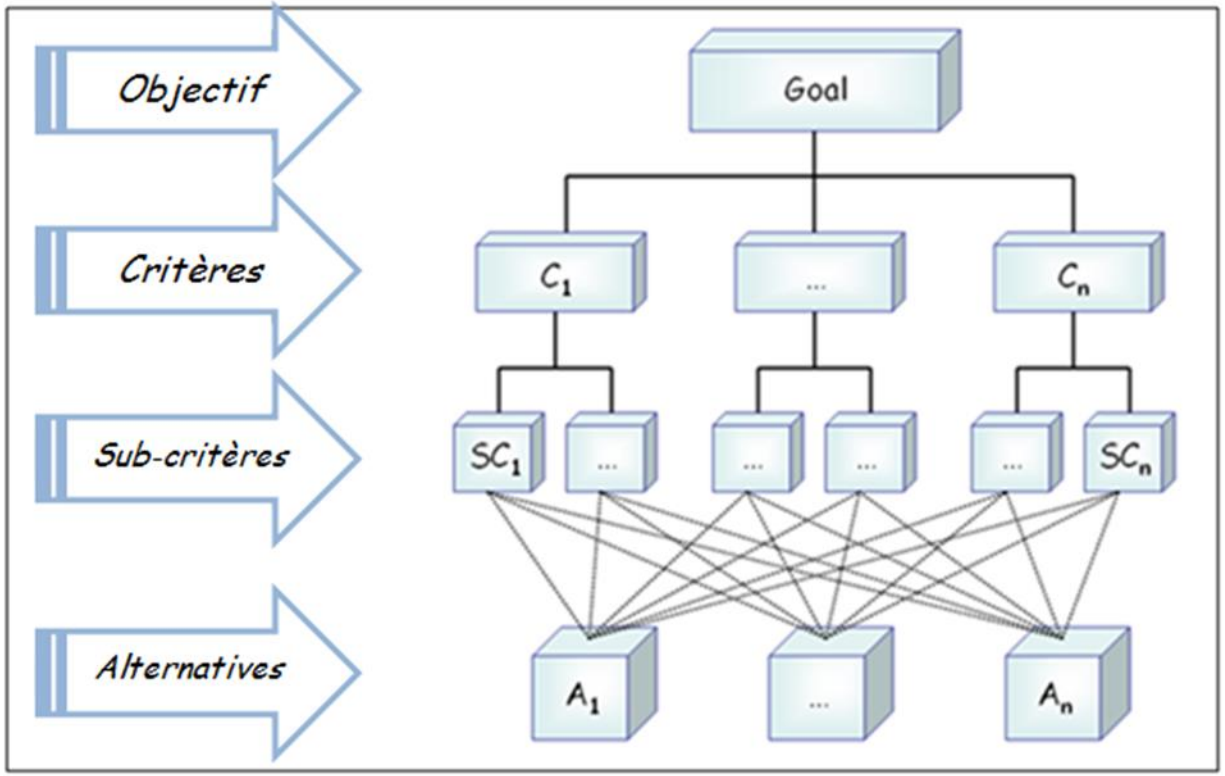
Table of Contents
Globe layers
Reseau_cyclable_2015_
Quartiers_sociologique
OGRGeoJSON
RUI_2014
Quartiers_sociologique
MilieuNaturelInterieurF
LIMADMIN
index_lidar_2015
Friche
Batiments_vacants_VM
Affectation du sol 2014
Reference/World_Boundar
World_Street_Map
World Street Map
World_Imagery
World Imagery
Low Resolution 15m In
High Resolution 60cm
High Resolution 30cm
Citations
73°33'50.405"W 45°28'56.871"N
Visibility: 0,541 Kilometers

Step three

$$\frac{Vmax - Vmin}{X} + 1 = 9$$

OG	CR1	CR2	C
CR1	1	1,20	0
CR2		1	0
CR3			
CR4			
CR5			
CR6			
CR7			
CR8			
CR9			
CR10			
CR11			
CR12			

Goal: Trasformazione
- CR_1 (G: ,127)
- CR_2 (G: ,092)
- CR_3 (G: ,115)
- CR_4 (G: ,082)
- CR_5 (G: ,095)
- CR_6 (G: ,097)
- CR_7 (G: ,105)
- CR_8 (G: ,056)
- CR_9 (G: ,071)
- CR_10 (G: ,071)
- CR_11 (G: ,060)
- CR_12 (G: ,027)



Results

Percentage distribution of the frequency of indicators falling under each main theme.

Theme	Criteria	LEED-ND		CASBEE-UD		BREEAM		CASBEE-PLUS UD	
Resources and environment	Water	14	33	13	41	3	23	13	41
	Energy	9		9		6		9	
	Materials, ecosystem, biodiversity, resources conservation, etc.	10		19		14		19	
Transportation		9		10		19		10	
Social	Affordable housing	2	9	0	6	2	11	14	33
	Inclusive communities	0		0		3		9	
	Safety, community well-being, community outreach, heritage, social networks, etc.	7		6		6		10	
Economic	Local jobs and economy, finances, investments, employment, business	2		0		8		14	19
Location, site selection		11		3		5		5	
Pattern and design	Mixed use	2	31	0	40	2	32	0	40
	Green infrastructure, compact development, access, urban planning and design standards, etc.	29		40		30		40	
Innovation	Accredited professionals	2	5	0	0	0	2	0	0
	Innovation	3		0		2		0	

Aspects sociaux

Aspects économiques

Conclusions

In the literature we realize that certification standards are, however, looking for a common measure. It is important to ensure that all certification steps are measured in the same manner to give a consistent message to the industry.

This does not mean adopting a universal certification system. Overall, the various systems have many differences.

A rough comparison, carried out by researchers BREEAM, buildings with a score of "Platinum" (the highest) for LEED, reach a score lower in the ranking of BREEAM.

Discussion

In Europe, where the certification standards are more stringent than in the USA. Europe has also adopted the analysis of life cycle assessment (LCA) to a greater degree than in North America. In recent years, Japan, on the other hand, has developed innovative policies with respect to the state of its cities (Tokyo, Osaka).

This is one reason why, in this study, the use of CASBEE-UD was chosen as a comparison standard. In its structure CASBEE-UD uses not only concepts linked to the building but also concepts related to the entire site's external environment.

Discussion

However, in this standard, the mainstreaming of social acceptability and identification of relevant indicators are not present.

It is believed that the integration of these brings an improvement and a more concrete assistance in the design of a more sustainably built environment.

We are of the opinion that this study is not comprehensive, but its structure is possible to highlight the fixed points that could help others seek to improve the structure of existing standards and make them independent of the interests of the furniture market which is oriented more towards labelling rather than take to heart the expectations of citizens.

Thank you

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