

Project Manager's role in Sustainable Building Projects: A case study in Canada

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Organisers:



International Co-owners:



Construction Industry in Canada

6% GDP

7.3% of employment

X

25% of waste generation

40% of energy consumption

35% greenhouse gas (GHG) emissions



Organisers:

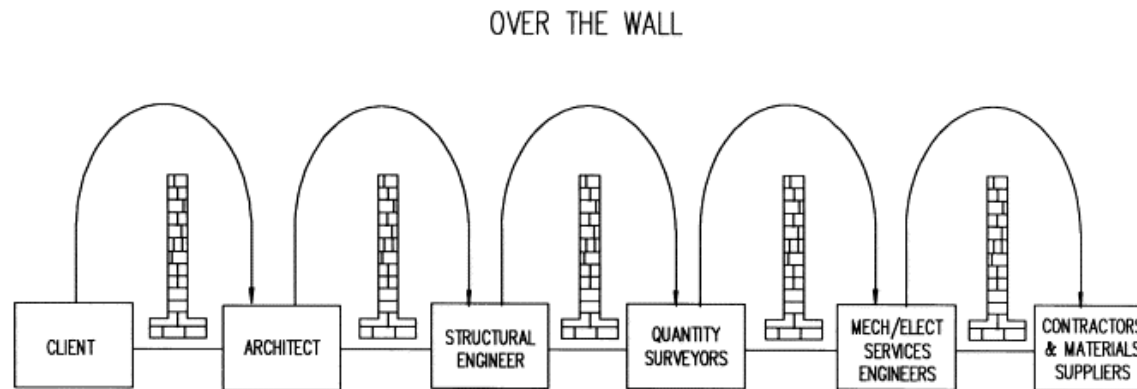


International Co-owners:



Fragmented nature of the construction industry

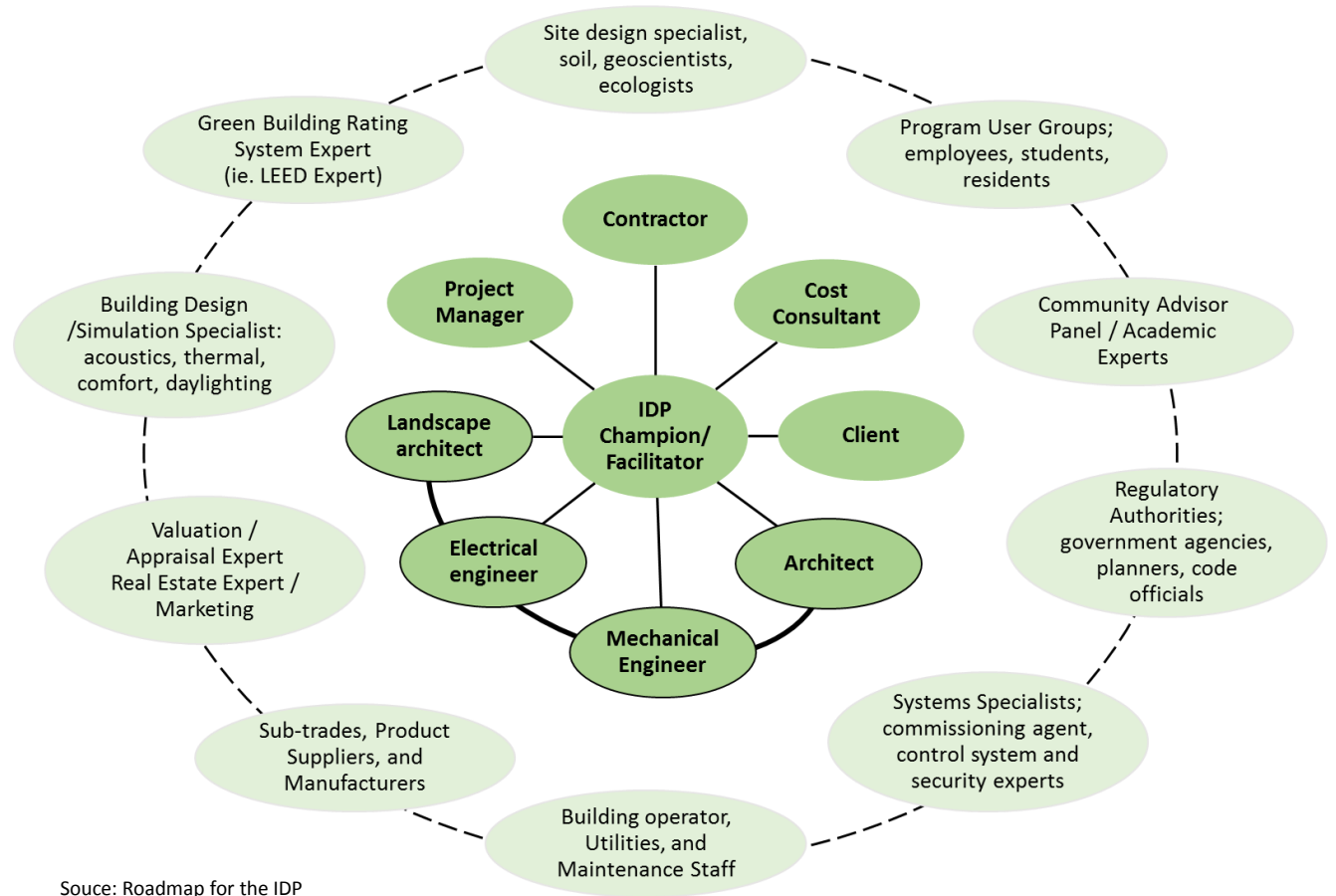
- Design project fragmentation
- Procurement fragmentation
- Construction industry (CI) supplier chain fragmentation
- Labor fragmentation at construction site



THE TRADITIONAL DESIGN AND CONSTRUCTION PROCESS

Source: Ebuomwan and Anumba (1998)

Integrated Design (ID)



Project management challenges in sustainable building

Project management role in a building process (traditional vs. sustainable buildings)

Key work stages	Planning	Design	Procurement	Construction	Operation
Traditional project management			←—————→		
Detailed work stages	Appraisal Design Brief	Concept Design Development Technical Design	Contractual documents Tender Documentation Tender Action	Site preparation Construction to completion Documentation commissioning	Post-practical completion and operation
Project management in sustainable buildings	←—————→				
Key phases in sustainable building	Sustainable building design (Integrated Design)			Sustainable construction	Sustainable Building operation

Adapted from Delnavaz (2012)

Project management challenges in sustainable building

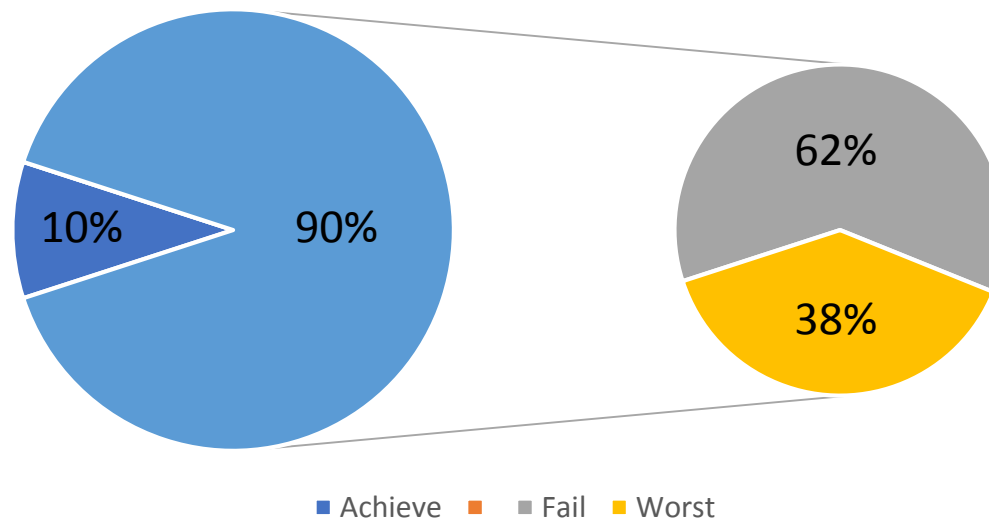
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Project management challenges in sustainable building

LEED project expectations (design phase)
X
The actual performance



Newsham et al., (2009)



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Case Study : Centre for sustainable development



Energy Modeling



Source: MSDL architects



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Research results

- 1) Stakeholders' collective engagement with common values
- 2) Increase in task complexity
- 3) Increase in time required in the designing phase
- 4) The operation is a key phase



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Research results

1) Stakeholders' collective engagement with common values

- ID process needs a “green champion”.
- Facilitator's role and legitimacy during the project charrettes.



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Research results

2) Increase in task complexity

- CSD involved all stakeholders in ID “charrettes” since the early phases of the project.
- Decision not only based on cost, but environmental impacts and energy consumption.
- Client as an environmental NGO organisation.



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Research results

3) Increase in time required in the designing phase

- No consensus on how to operationalize charrettes.
- Waste of time can inhibits innovation and collaboration.
- Mere participation vs. effective decisions.



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Research results

4) The operation is a key phase

- Commissioning phase is vital for optimizing the building's overall energy performance but not sufficient to transfer knowledge to the building's new stewards.
- Targets defined during ID charrettes vs. actual performance.



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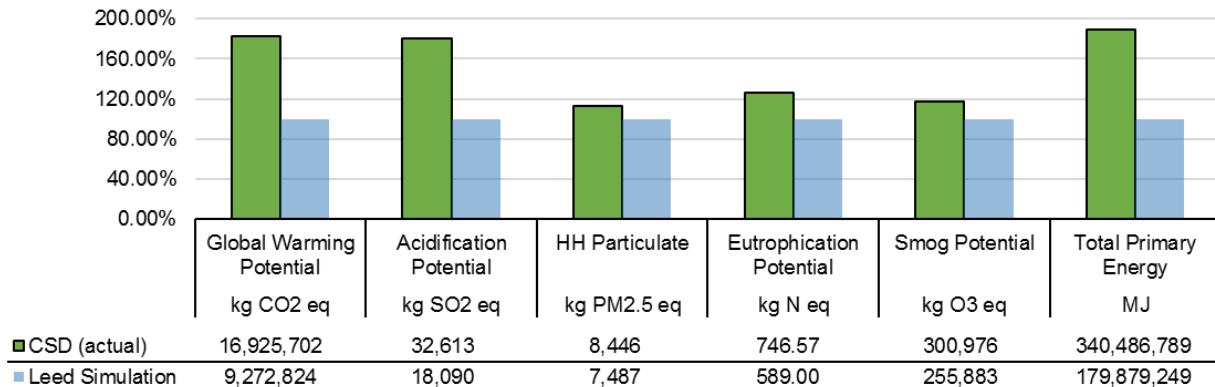


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Research results

Impact scores for LEED simulation and actual consumption in CSD



Comparative between LEED Energy simulation and real consumption (last four years).

	Reference Building	LEED simulation	2012	2013	2014	2015
Electricity (Kwh)	1,121,928	721,954	1,390,333	1,391,386	1,512,092	1,323,251
Gas (m3)	113,645	4,206	10,644	29,046	25,223	3,084



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Discussion and conclusion

ID promise to reduce fragmentation in the design and consecutive phases.

- In reality, even if fragmentation in the design phase is reduced, **it still occurs** during the construction and the operation phase.
- Adopting ID in the design phase alone is not able to reduce fragmentation in following phases (notably without **changes in the role of the project manager**).



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Discussion and conclusion

- 1) The PM needs to be hired earlier, before project's feasibility stage.
- 2) The PM needs to assist the client by organizing project design “charrettes” (new tools and techniques).
- 3) Led by PM, the project team needs to follow the operation phase of the building.



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Discussion and conclusion

1) The PM needs to be hired earlier, before project's feasibility stage.

- The PM has the responsibility for building **teamwork** by the same values.
- The early development of a **sense of common goal** can increase the willingness of the parties to **collaborate** and achieve sustainability goals.
- An opportunity for the PM to **build links between phases and professionals**.



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Discussion and conclusion

2) The PM needs to assist the client by organizing project design “charrettes” (new tools and techniques).

- Life Cycle Analysis (LCA) to measure the **impacts of design** approaches, technical solutions, and materials.
- **New challenges and complexity** facing sustainable buildings projects.
- Helping better preparing ID design “charrettes” can improve the design process and **diminish** the team members' **impression** that they are “**wasting their time.**”



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Discussion and conclusion

3) Led by PM, the project team needs to follow the operation phase of the building.

- Documentation and the commissioning phases was **not able** to successfully **transfer project knowledge**.
- The PM can collaborate in overcoming this weakness by **extending its participation** in the project during the **operation of the building (3 to 4 years)**.
- By **reducing** the four levels of **fragmentation** (previously identified), the PM can help construction sector have a **more positive impact** on **society** and the **environment**.



Organisers:



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Thank you



Source: MSDL architects

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