

Integration of LCA and LCC for decision making in sustainable building industry



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Content

LOGO

1. Background of research

2. LCA and LCC in building industry

3. Integration of LCA and LCC

4. Conclusion

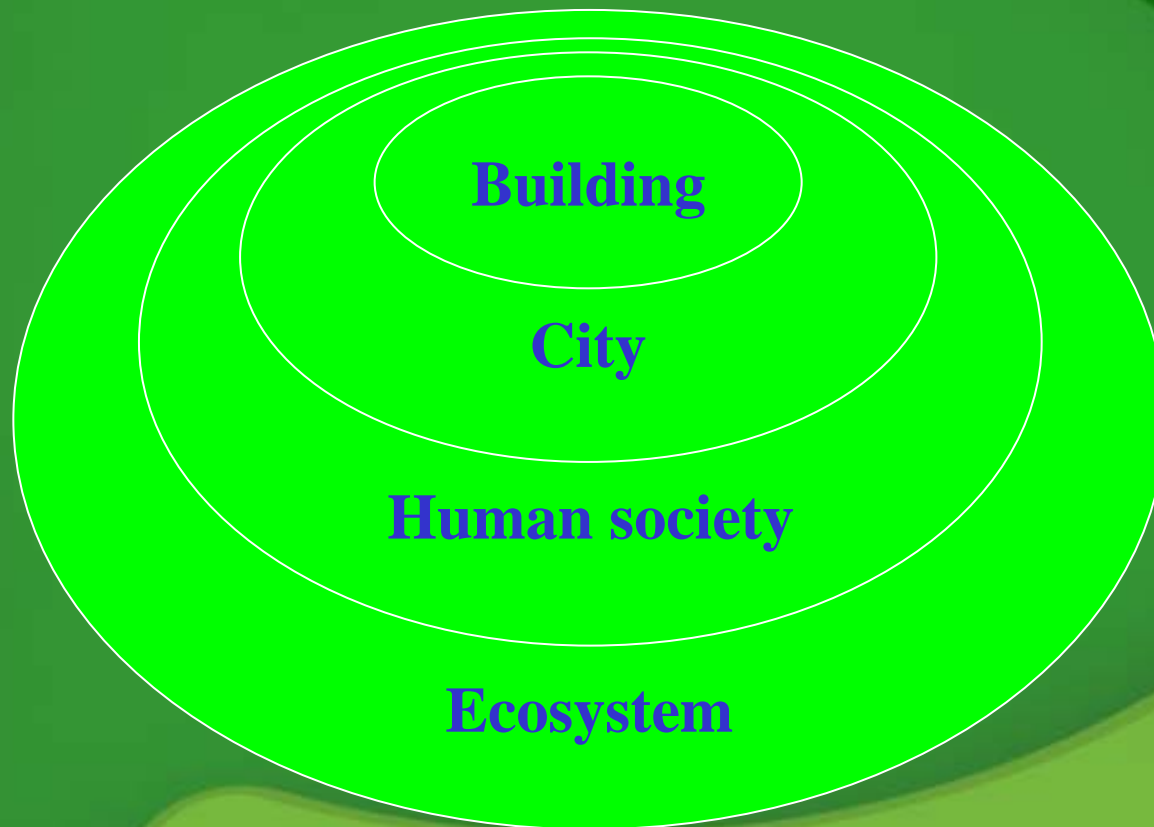


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Part I Background of research

1. Connection of different systems to environmental impact

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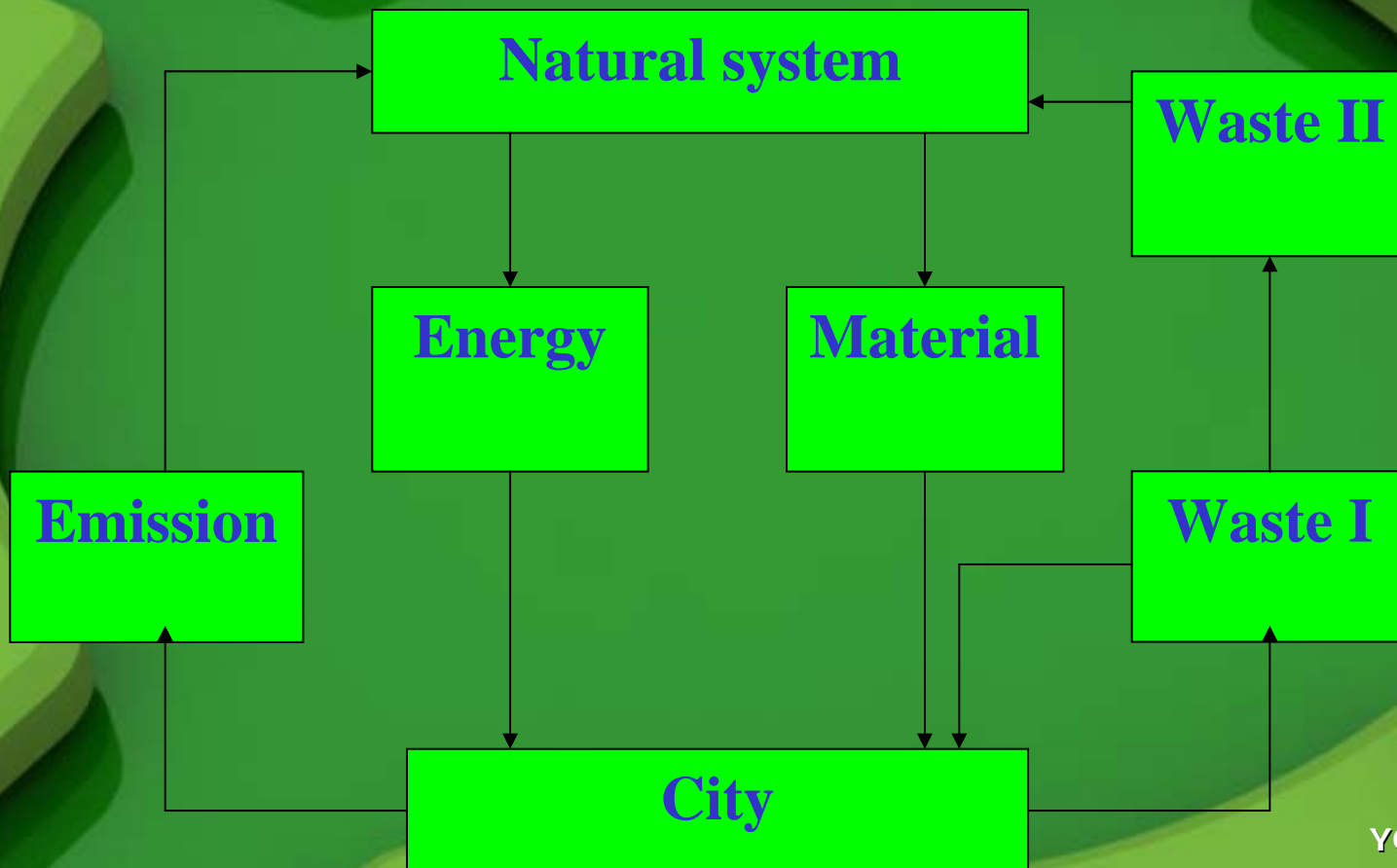


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Part I Background of research

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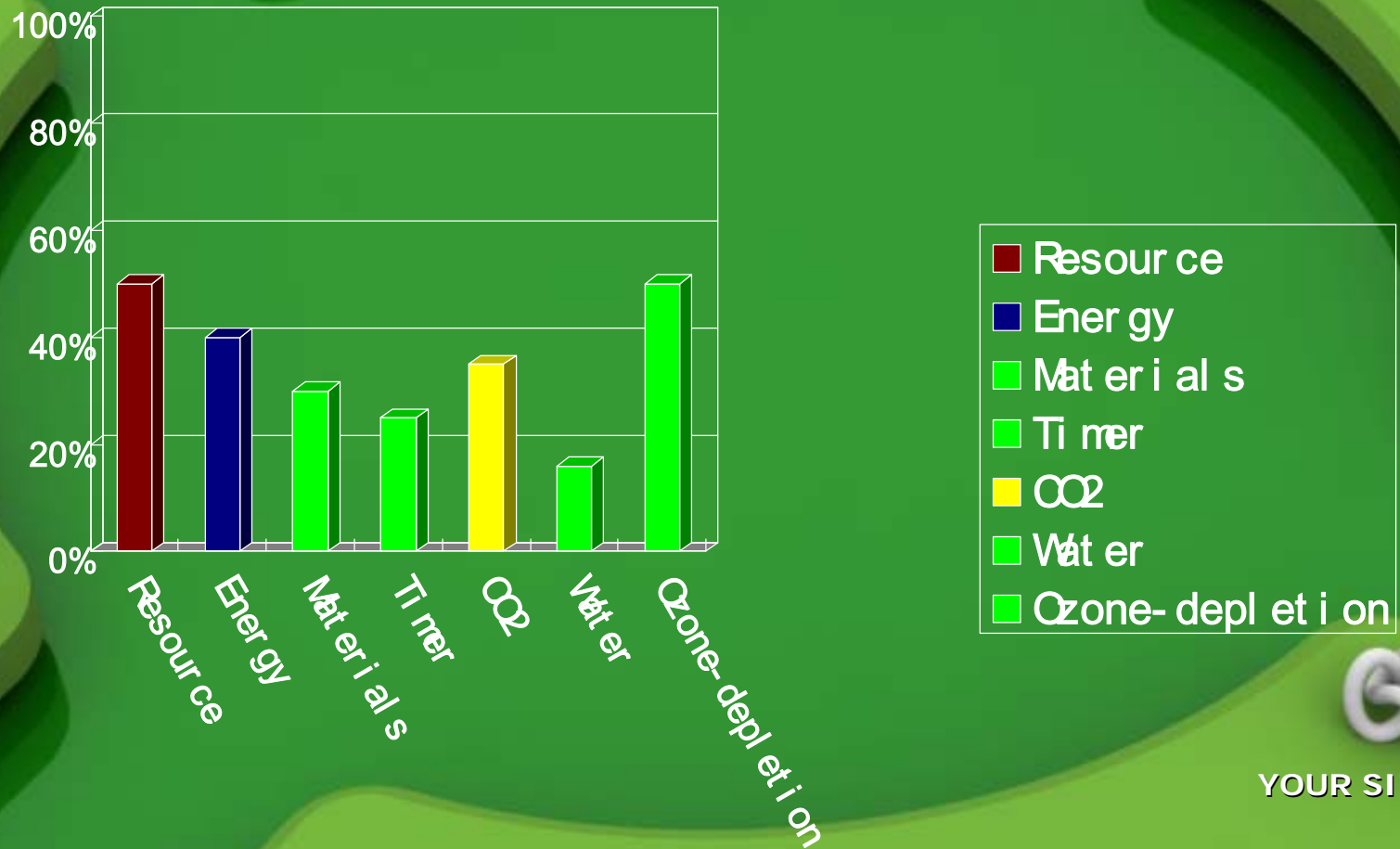
2. Environmental impact from city



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Part I Background of research

3. Environmental impact from building LOGO

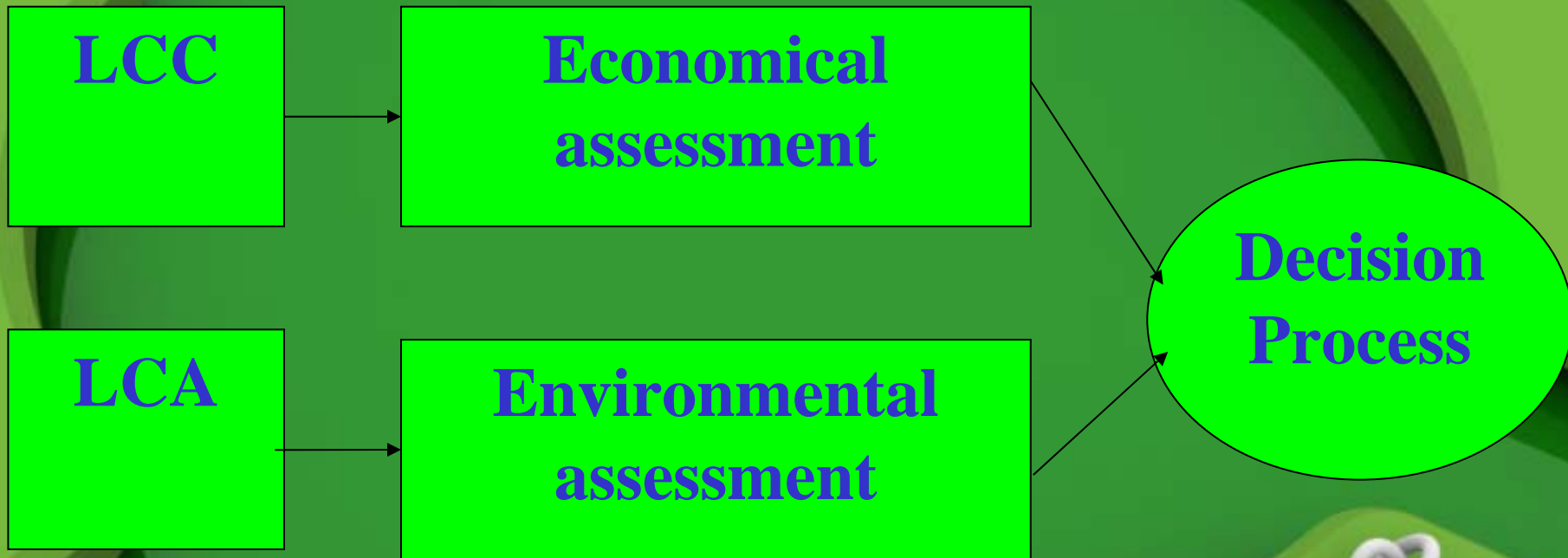


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Part II LCA and LCC in building industry

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1. General introduction



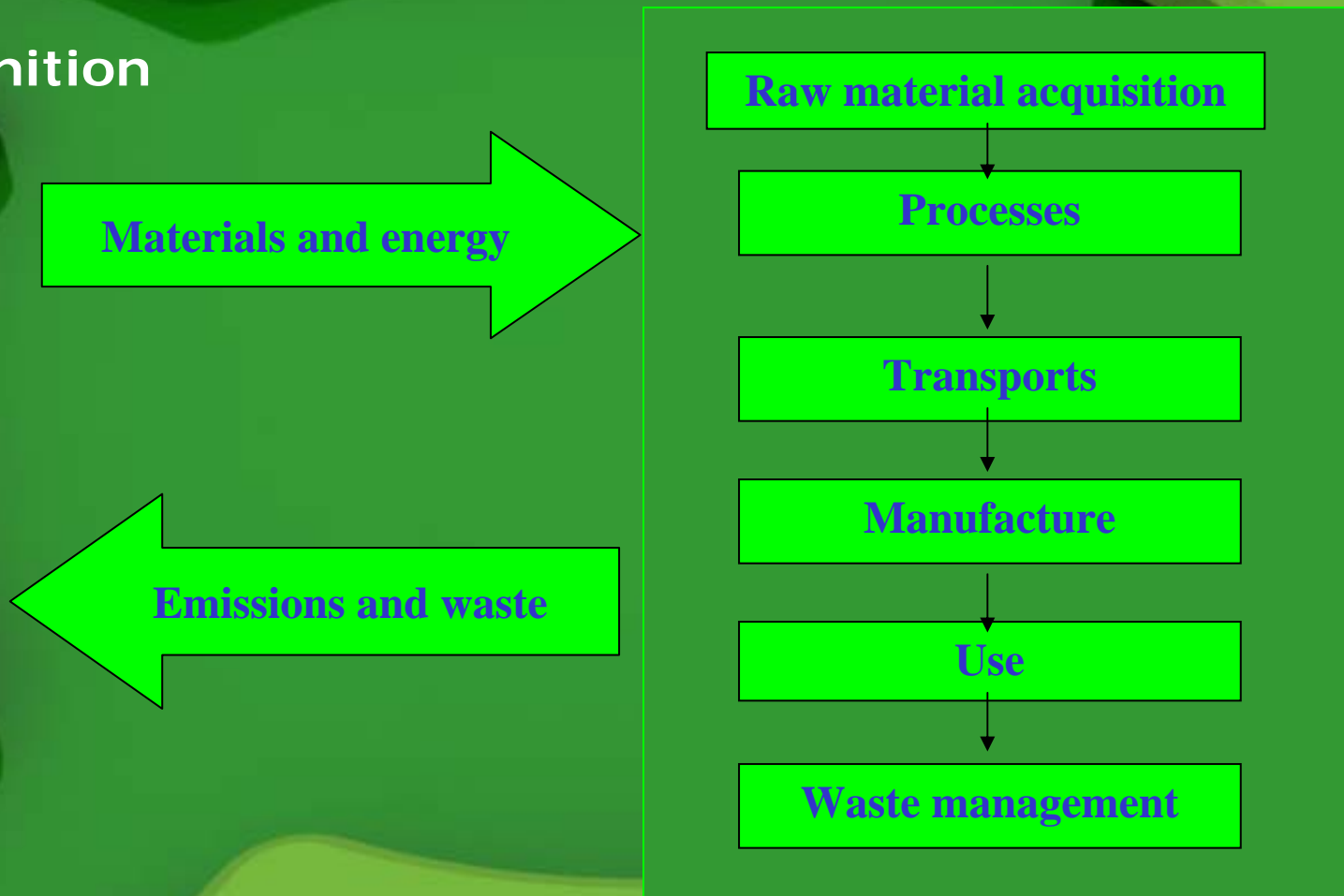
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Part II LCA and LCC in building industry

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2. Introduction of LCA

➤ Definition

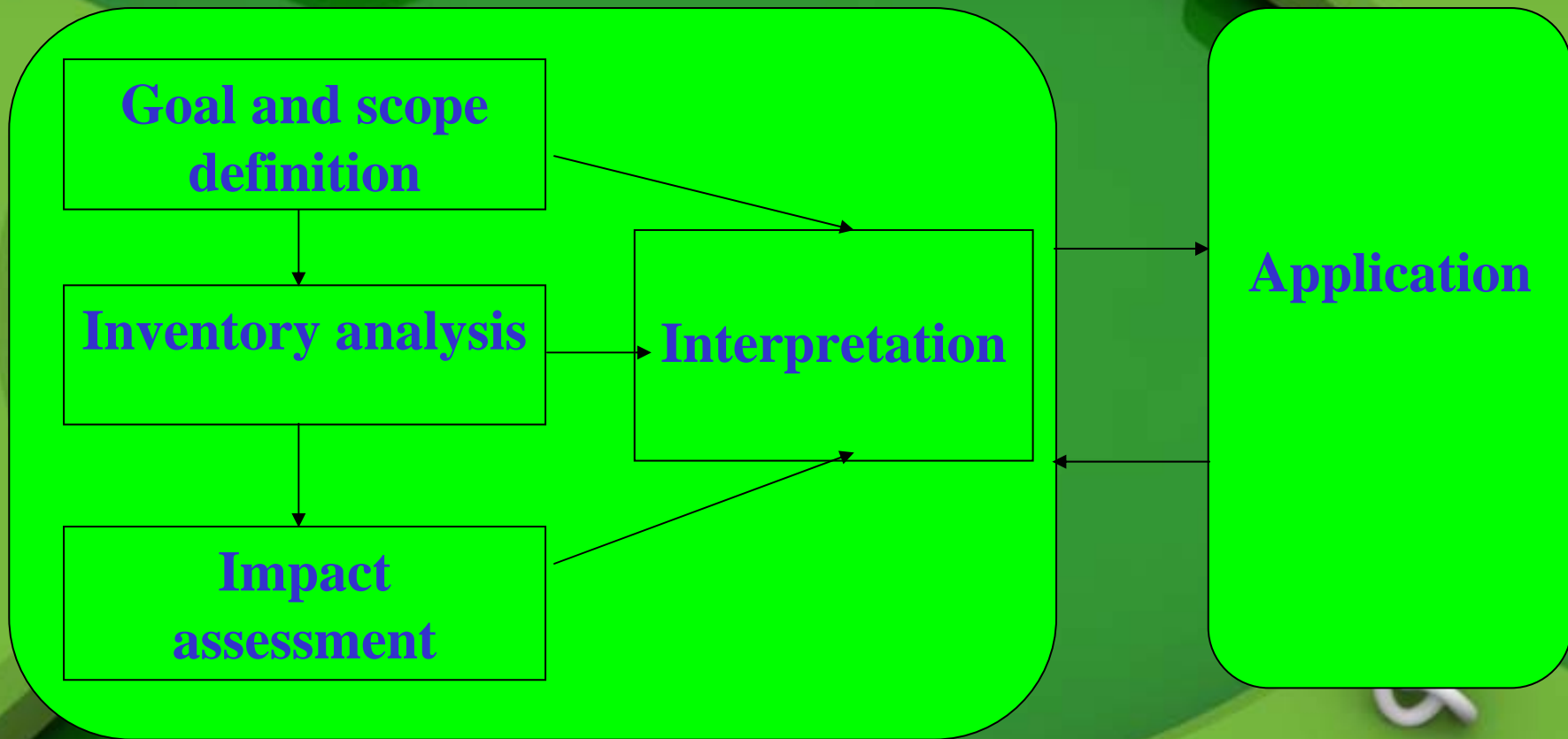


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Part II LCA and LCC in building industry

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➤ Procedure

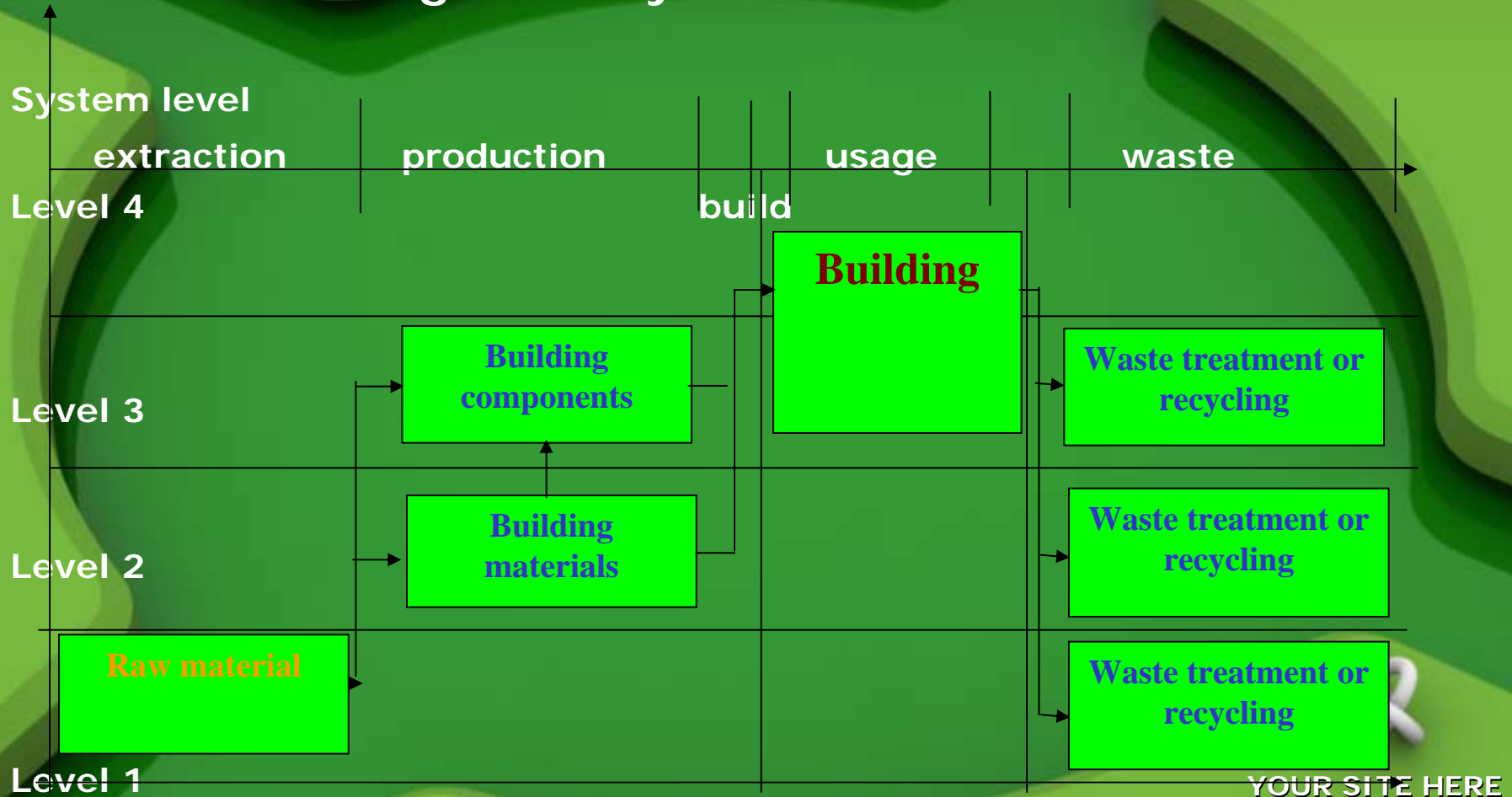


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Part II LCA and LCC in building industry

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➤ LCA in building industry



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Part II LCA and LCC in building industry

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➤ Dominance analysis



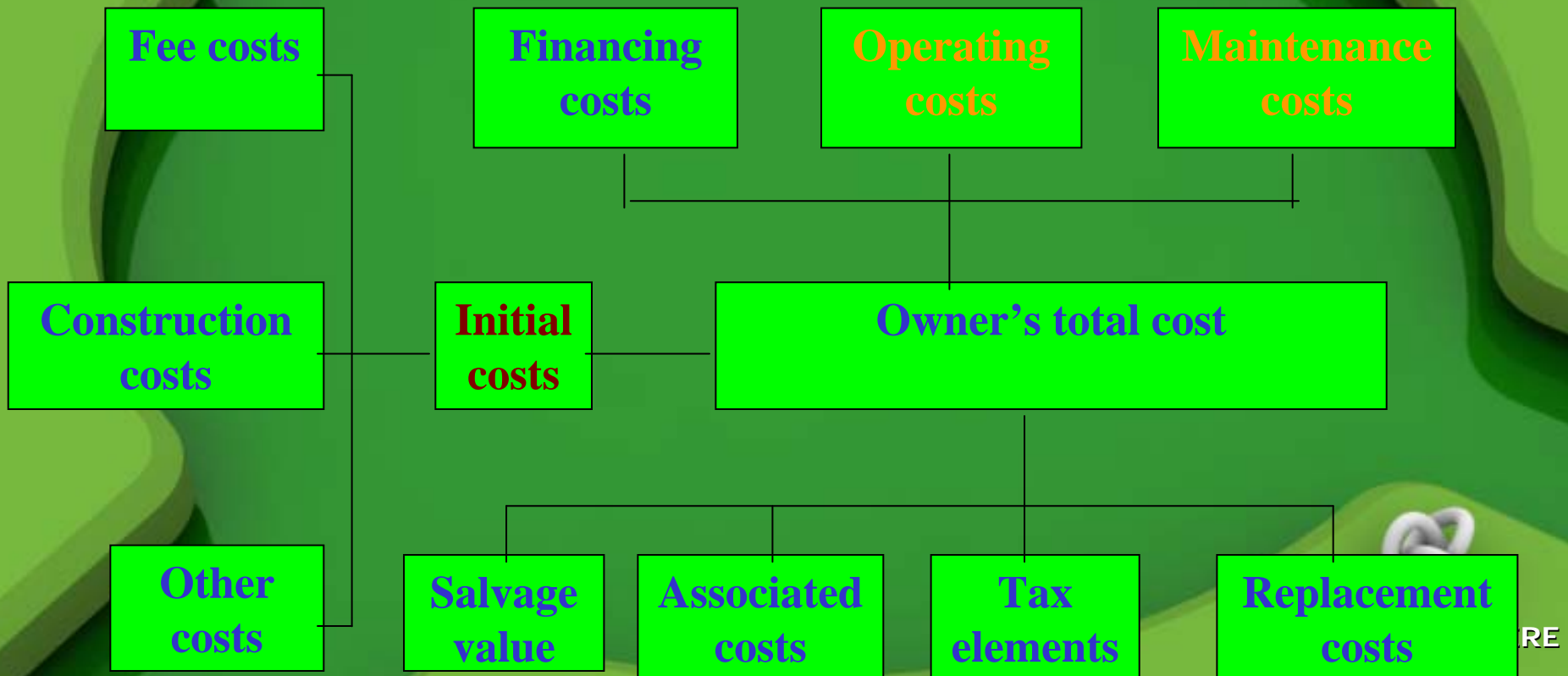
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Part II LCA and LCC in building industry

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3. Introduction of LCC

➤ Definition



Part II LCA and LCC in building industry

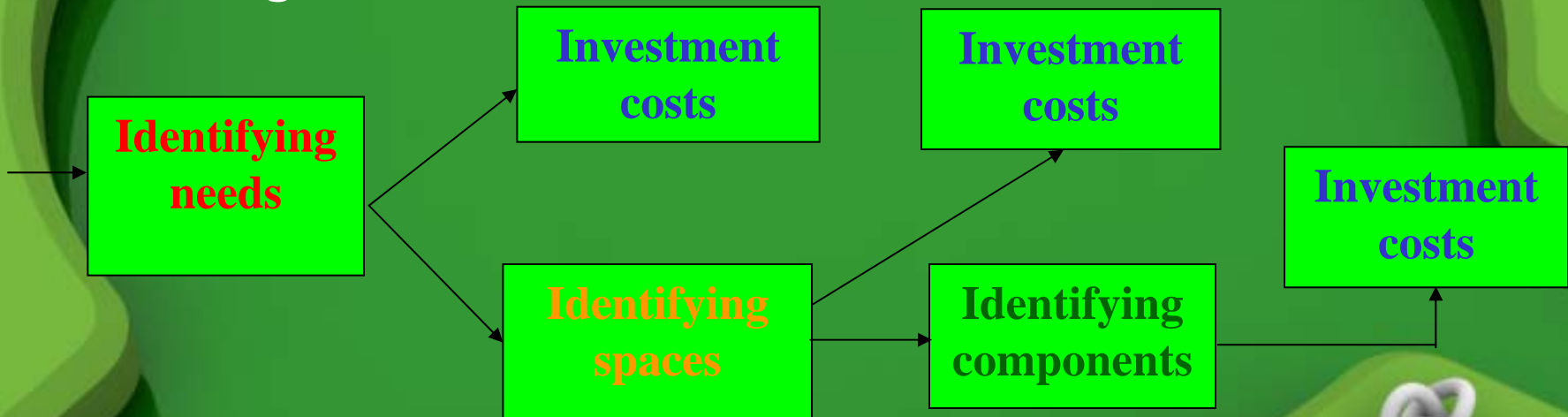
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➤ LCC in design phase

The decision in design phase is important and complex

Two factors: **multi-disciplinary** and **effective timing**

Three stages:



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Part II LCA and LCC in building industry

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➤ LCC in other phases

LCC during the construction phase and operation phase have limited result and only in providing data for **future project**. It can improve **competitiveness, environmental awareness, supply chain performance, long-term cost optimization and reliability of project information**



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Part III Integration of LCA and LCC

1. Similarities of LCA and LCC

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SIMILARITIES	LCA	LCC
<i>Method</i>	Quantity and upstream	Quantity and upstream
<i>Focus</i>	Future benefit	Future benefit
<i>Function unit</i>	production's function	production's function
<i>Key phase environmental impact</i>	Operational phase	Operational phase
<i>Reference flow</i>	According to function unit	According to function unit



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Part III Integration of LCA and LCC

2. Differences of LCA and LCC

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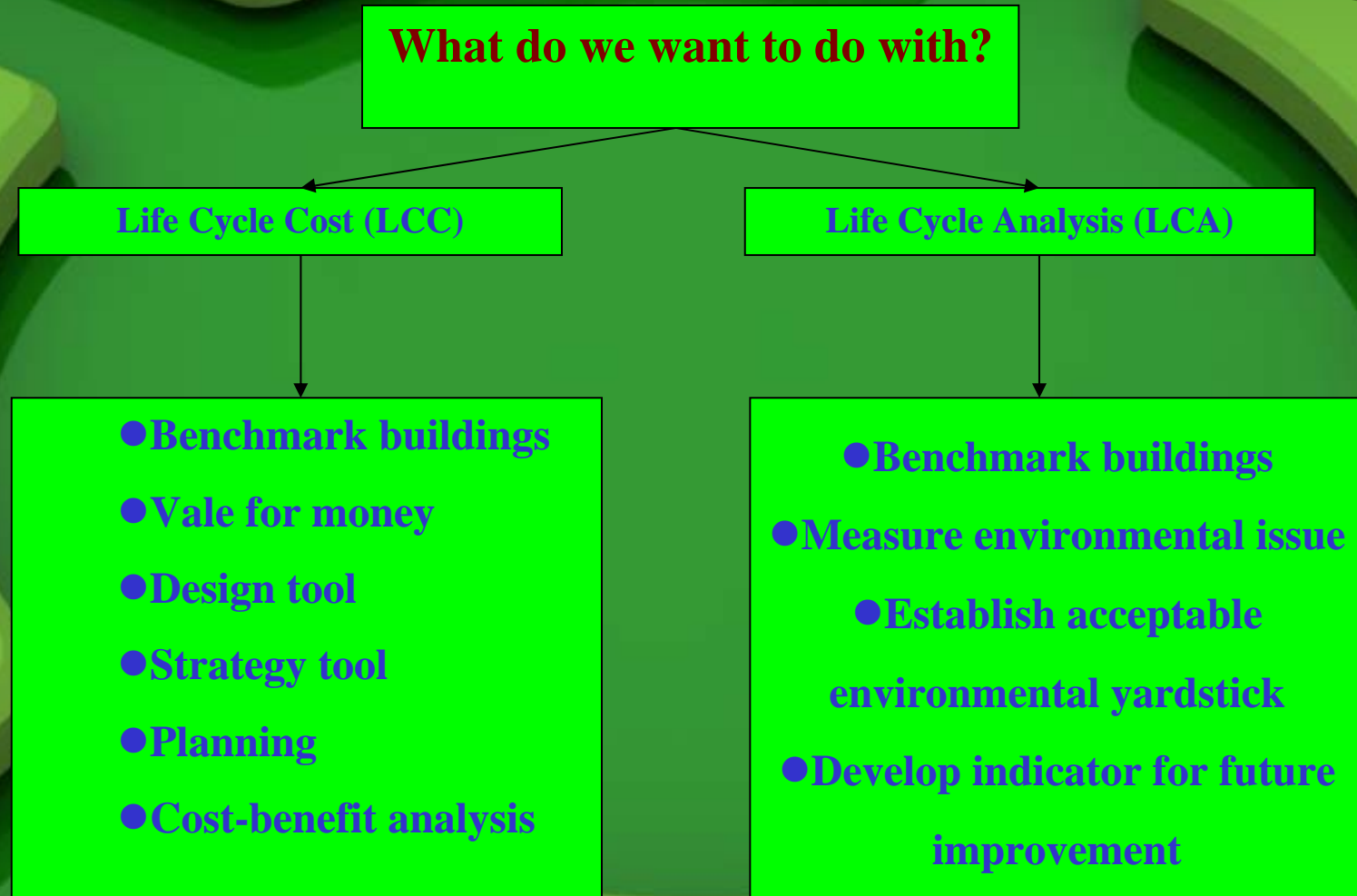
DIFFERENCES	LCA	LCC
<i>Life cycle</i>	"Cradle to grave"	Pre-cradle
<i>System boundary</i>	No production capital and personnel	Cost of everything in life cycle
<i>Key phase decision making</i>	Construction phase supplier	Design phase client
<i>Scope</i>	Materials and products	Cost
<i>Data available</i>	All activities, no price	All costs, no detail activities
<i>System expansion</i>	Energy and material flow is easy to added	Value added
<i>Allocation</i>	Heavy debated	Easy to do
<i>environmental impacts</i>	Air, soil and water	Not considered
<i>Cost calculation</i>	Not considered	Total system costs

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Part III Integration of LCA and LCC

3. Function of LCA and LCC

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Part III Integration of LCA and LCC

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4. Connection of LCA with LCC

LCC = Capital investment + NPV [(use and Maintenance costs) + (operating cost) + (repairs +rehabilitation) + (salvage value) + (environmental LCA factors) + (occupational LCA factors) + (location LCA factors)]

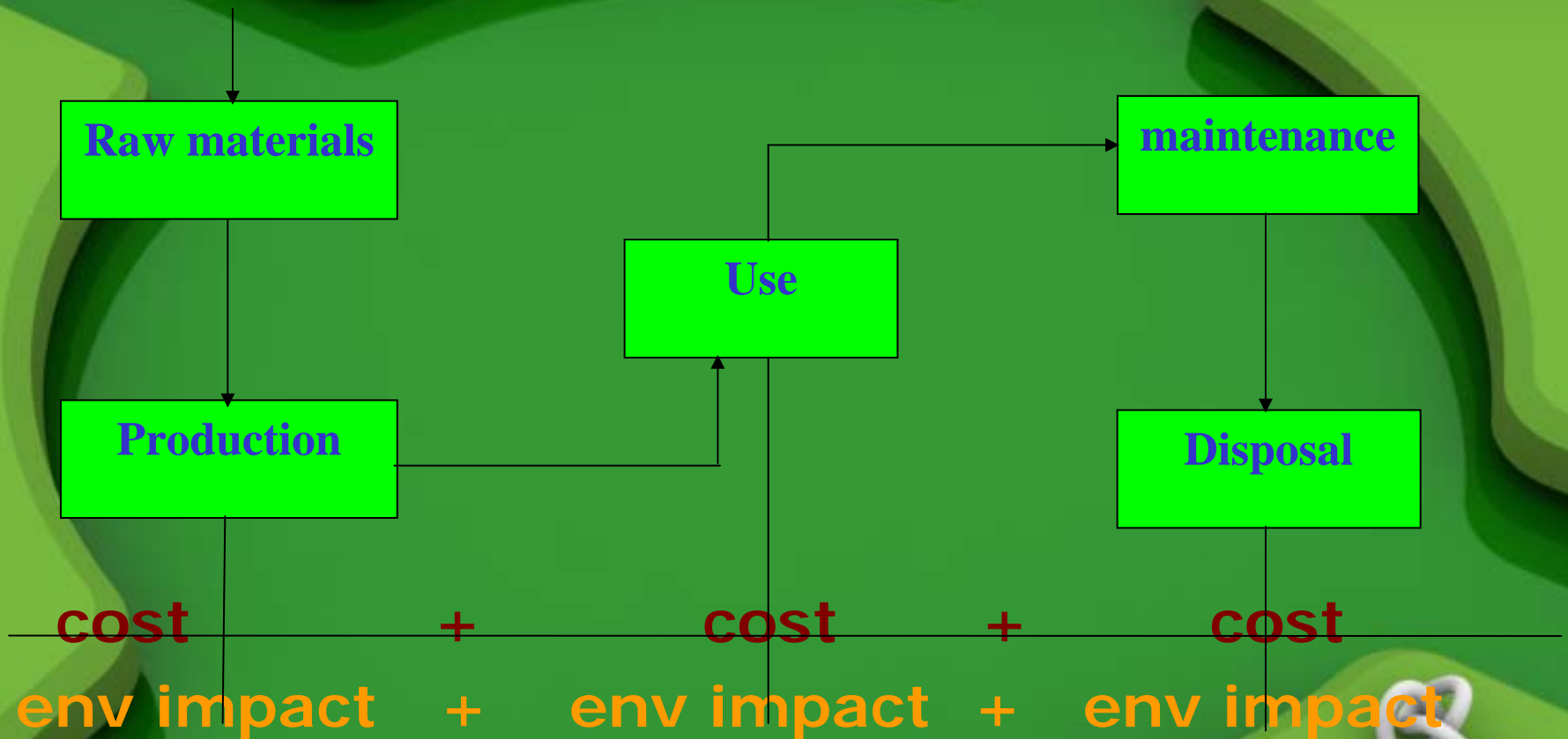


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Part III Integration of LCA and LCC

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5. Connection of LCC with LCA



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Part III Integration of LCA and LCC

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6. Database of combination of LCA and LCC

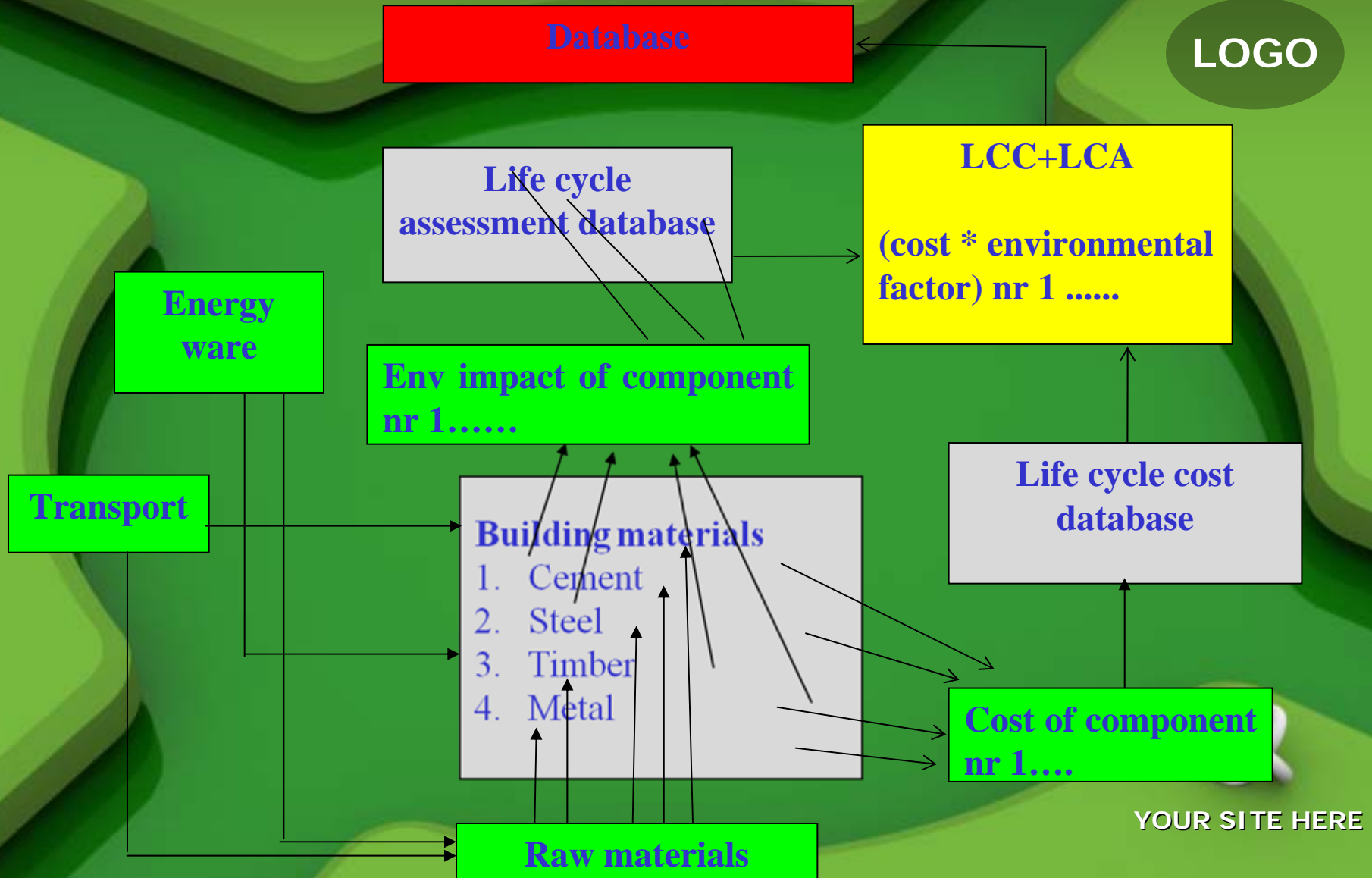
Three basic tables in data structure

- **Table of activities** in building sector;
- **Table of building materials and components**, in which LCIA is saved;
- **Table of life cycle cost worksheet**, which includes cost of different components.



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Part III Integration of LCA and LCC



Part IV Conclusion

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➤ Limitation

1

Database is complex and hard to updated;

2

Data is insufficient and sometimes unreliability



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Part IV Conclusion

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➤ Limitation

3

Client pursue for maximum benefits

4

Life cycle of building is too long



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Part IV Conclusion

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➤ Further development

1.

Database
development

2.

Enhance
communication
among
participants

3.

Long term
version



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Thanks!



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