Funded by the Carbon Trust, EPSRC and NERC
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Carbon Calculations over the Life Cycle of Industrial Activities (CCaLC)

Overview of the Project

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Carbon Calculations over the Life Cycle

Project aim

- To develop
  - a life cycle methodology and
  - decision-support tools

  for estimation of emissions of CO_2 and other greenhouse gases in different industrial sectors along the complete supply chains

- Tailored for the specific needs of industry and policy makers

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Example questions

- What is the carbon footprint of this supply chain? And of my process/product?
- Where are the ‘hot spots’?
- Where is the value added?
- How does value added relate to carbon added?

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Example questions

- What are the optimum options for reducing the carbon footprint?
- What would be the cost? And value added?
- What are the trade-offs between environmental benefits and economic costs?
- What policy measures are needed for reducing carbon footprints?

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Methodology

- Whole systems approach
  - Whole supply chains/life cycles

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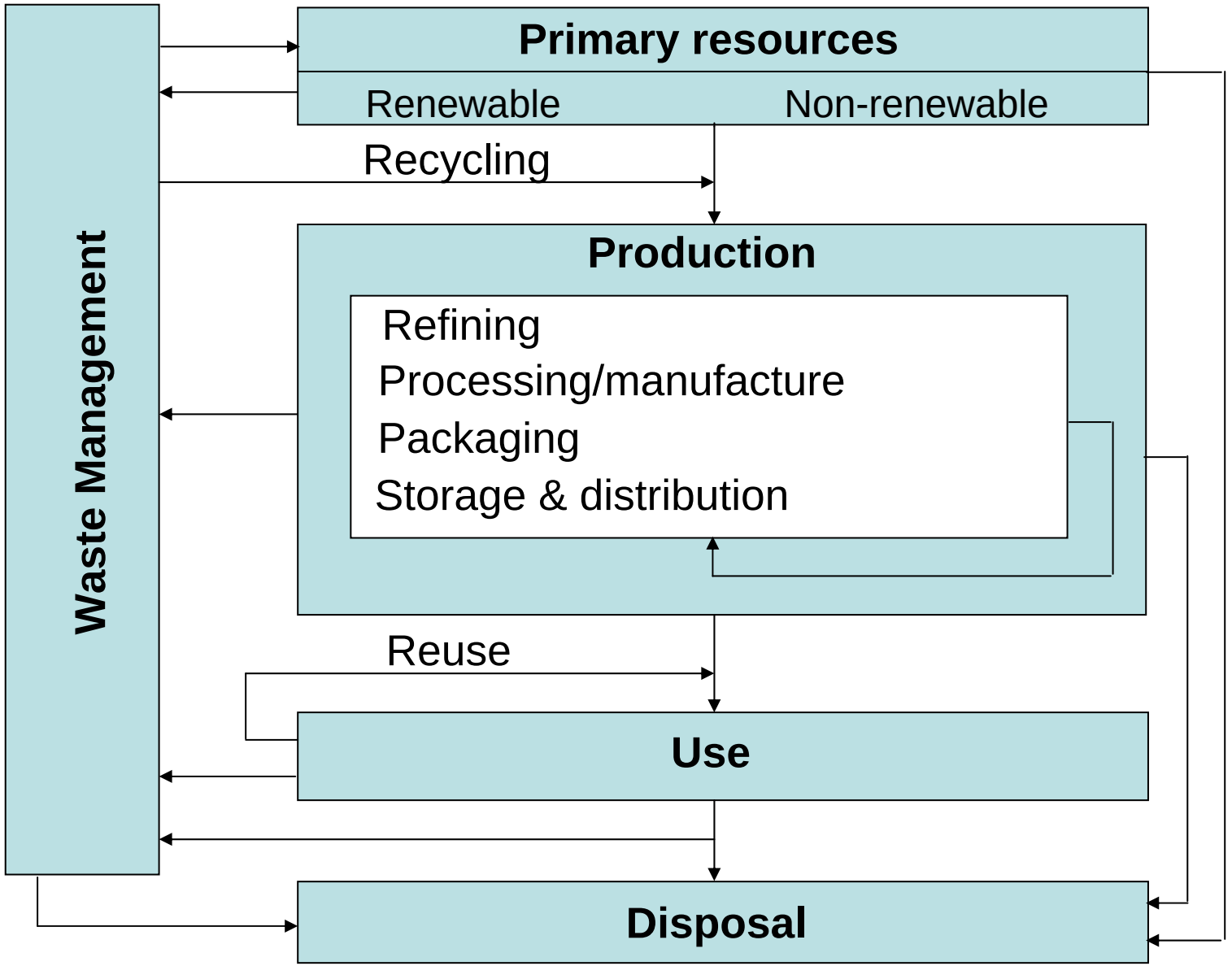
Whole systems approach



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Methodology

- Current situation
  - ‘Hot spots’
- Future changes
  - Low-carbon options to reduce carbon footprints
- Emphasis on carbon footprint but other impacts also considered

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Methodology

- Integrated environmental and economic assessment
  - Carbon added
  - Value added
- System optimisation
- Multi-criteria decision analysis (MCDA)

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Value Chain Analysis (VCA)

- Flows/stocks of materials through economy associated with economic values
- Values will be mapped in a process referred to as Value Chain Analysis (VCA)
- The aims are three-fold:
  - Identification of low and high-value adding activities and processes
  - Energy use
  - Carbon mitigation measures and costs

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Project deliverables

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- An integrated life cycle methodology and decision-support tools for:
  - Calculating carbon inventories, including
    - carbon ‘footprints’ and ‘embodied’ carbon
    - extended life cycles with re-use, recycling and down-cycling
    - Products, processes and services
  - Exploring business, political and economic scenarios for carbon management and reduction
  - Estimating economic and environmental implications of low-carbon processes, products and services

Project deliverables

- Generic terminology and nomenclature
- A standard data acquisition methodology and databases
- A general modelling framework and a software package
- Case studies to test the methodology and software tools

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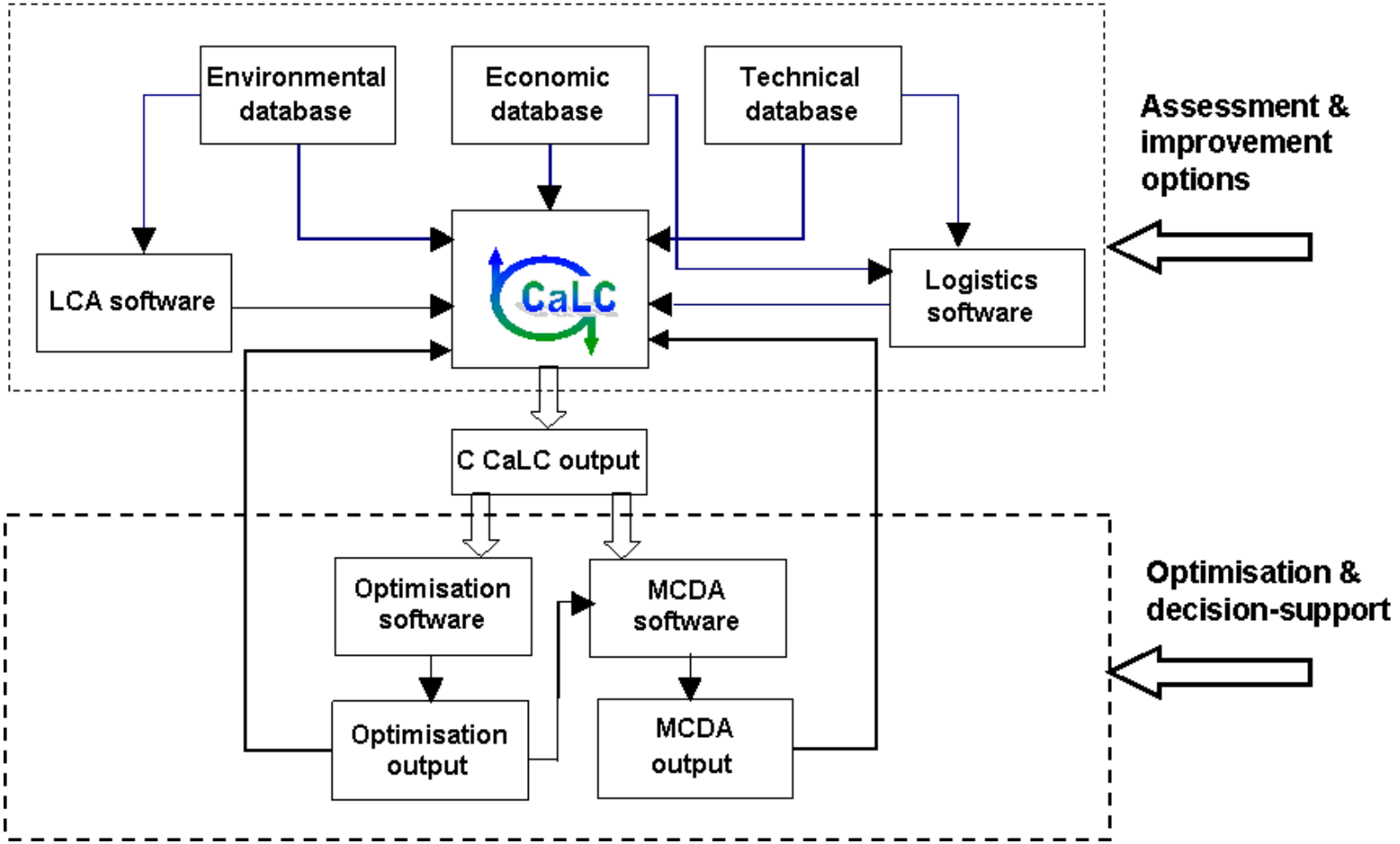
Software platform



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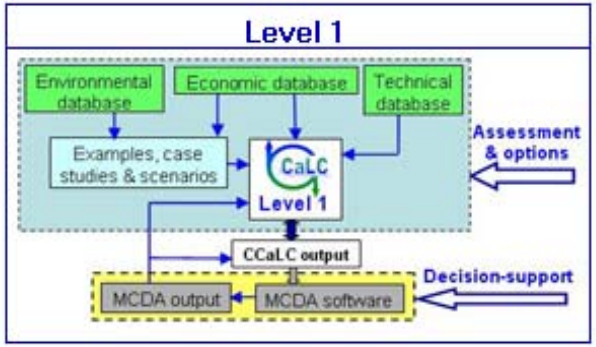
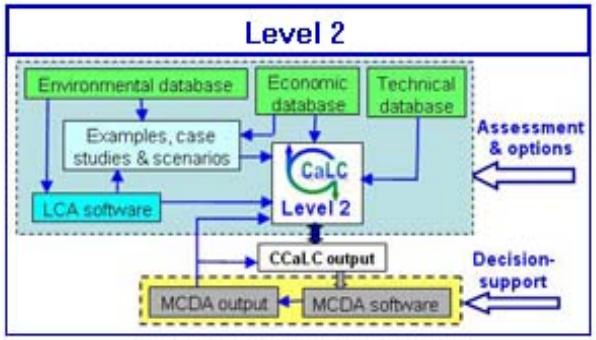


Level 1 (Basic)

At this level, CCaLC will support simple/screening LCA and value added studies and will have the following basic capabilities:

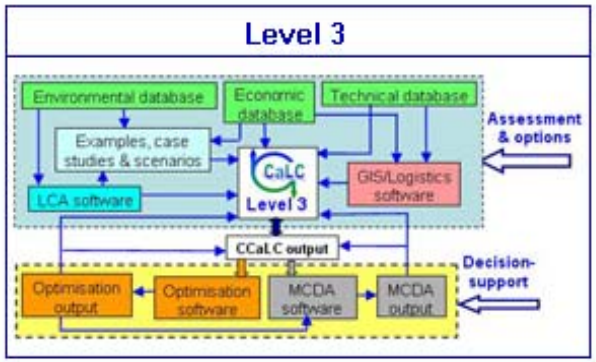
- **Simple, spreadsheet-based, models**
- **Built-in databases, examples, case studies and scenarios; and**
- **Simple multi-criteria decision analysis to support decision making.**



Level 2 (Intermediate)

This intermediate level will support full LCA and value added studies and will enable the end-user to:

- **Pose specific questions beyond the built-in case studies and scenarios; and**
- **Manipulate existing as well as define own systems, scenarios and data.**



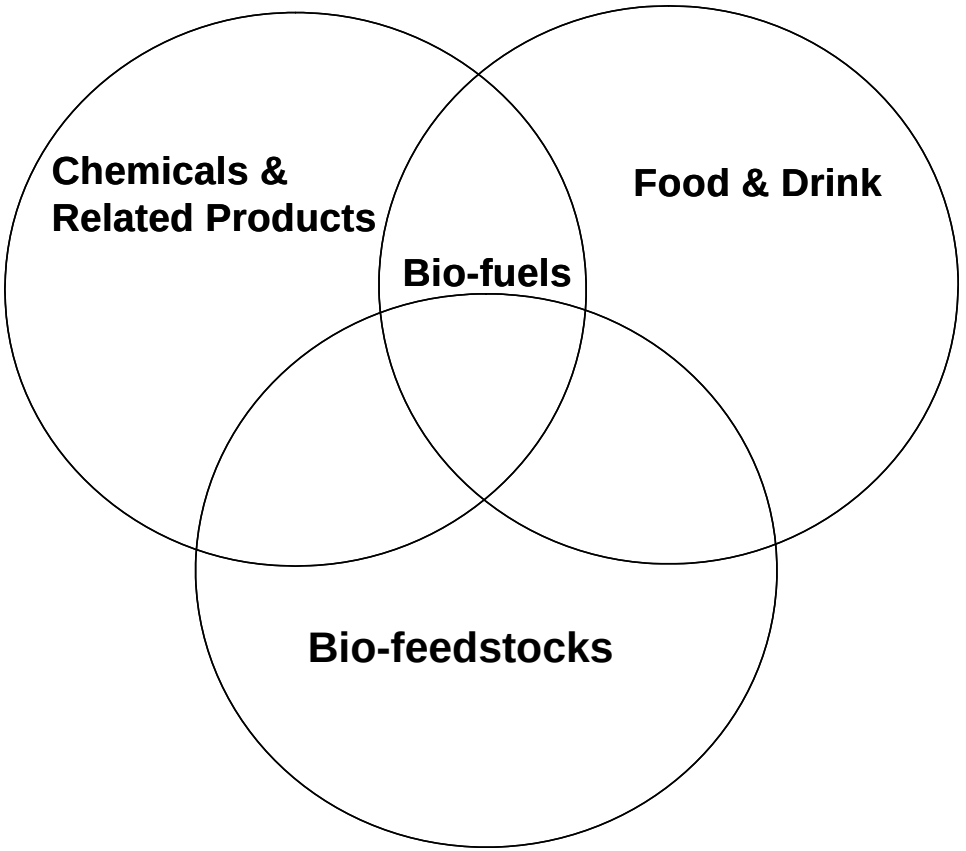
Level 3 (Advanced)

The Level 3-user will be able to carry out detailed LCA and value added studies and will have access to advanced capabilities of the CCaLC software, including:

- **Creation of own LCA/value added models and input of own data;**
- **Process and logistics optimisation with access to the appropriate commercial software packages; and**
- **Full multi-criteria decision analysis (MCDA) with access to a commercial software package.**

Case studies

- Chemicals and related products
- Food and drink
- Biofeedstocks
- Biofuels



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Innovation

- Systematic estimation methodology for carbon footprints and other environmental impacts
- Integration of environmental and economic aspects
- Sector, product, process or activity specific
- Integrated databases for a range of industrial sectors and supply chains
- Flexible modelling platform

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