

Appendix 11: Checklist of Project Lifecycle Cost Categories

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Concept and definition

- Market research.
- Project planning
- System concept and design analysis.
- Preparation of a requirement specification of the product

Design and development

- Project management – cost of planning and monitoring all project activity.
- System and design engineering including reliability, maintainability and environmental protection activities – cost of employing engineers with appropriate expertise.
- Design documentation – cost of preparing comprehensive documentation to enable construction, manufacture, installation, operations and maintenance.
- Prototype fabrication – to check that the proposed design will work, for example a pilot plant.
- Software development – it is rare for software cost estimates to be accurate.
- Testing and evaluation – some systems and components will need to be tested to ensure they will work as expected.
- Productivity engineering and planning – to ensure that the system will provide the expected benefits.
- Vendor selection – choosing appropriate suppliers (vendors) and ensuring that they can meet the required level of technical capacity and competence takes engineering time and effort.
- Demonstration and validation – providing reasonable assurance that the project as a whole will comply with requirements.
- Quality management – ensuring that all the work meets the required standards for accuracy and elimination of mistakes and errors.

Manufacturing and installation:

- Once only costs for each project —
 - Planning and optimizing construction and manufacture,
 - construction of support facilities,
 - procurement, manufacture of production tooling and test equipment,
 - spares and repair parts for manufacturing equipment,
 - initial training of personnel,
 - process and equipment documentation, setting up operation, accounting, logistics and maintenance management systems and software,
 - qualification testing – proving that the equipment works to the required standards.
- Recurring costs —
 - production management,
 - facility maintenance,
 - fabrication (labour, materials and the like),
 - quality control and inspection,

assembly, installation and checkout,
packaging, storage, shipping and transportation,
ongoing training, and
insurance.

Operation and maintenance

Operation —

labour costs (see chapter above)
training, re-training, maintenance of skill levels,
materials and consumables,
energy (for example, electrical power, fuel, including supply and support costs),
hire of temporary equipment and facilities, rent, accommodation, and
engineering modifications, upgrades and improvement.

Maintenance (items not included above) —

facilities, support, consumables, tools
contractor services, and
IT support.

Logistics (items not included above) —

spare parts and repair or replacement material,
warehousing facilities, and
packaging, shipping and transportation.

Support services —

corporate management,
administration, accounting, and
insurance.

Disposal, Decommissioning

system shutdown (labour, materials, specialist contractors)
disassembly and removal,
recycling or safe disposal, and
sale of residual equipment.