

Design-to-Cost: anchoring cost targets early in development

Design-to-Cost is an approach in which target costs are anchored early in product development and design decisions are consistently aligned with these targets. Unlike retrospective cost reduction programmes, the cost framework is treated not as a result but as a specification. For buyers and supply chain managers, the approach is a lever because the majority of life cycle costs are already determined during the development phase.

Key facts

- Design-to-Cost sets target costs as a binding specification for design, manufacturing and procurement.
- The largest share of product costs is typically determined in the early development phase, where changes are still inexpensive.
- Procurement brings in supplier know-how and material and process costs at an early stage, for example through supplier co-creation.
- Typical methods include should-cost analyses, value analysis and target costing.
- Success requires clear governance, shared target metrics and anchoring in the procurement policy.
- Retrospective cost reductions are usually more expensive and less effective than early cost management.

Definition: Design-to-Cost

Design-to-Cost describes an approach in which target costs – frequently unit or life cycle costs – are defined early in the development process and treated as hard constraints for design, material selection and manufacturing planning. The cost framework drives development rather than merely documenting it.

Distinction from cost-down programmes

Classic cost-down programmes only take effect after the start of series production, when design, tooling and contracts are largely fixed. Design-to-Cost starts earlier and exploits the design latitude of the early phase. In practice, the two approaches are complementary: Design-to-Cost establishes the cost basis, while ongoing optimisation secures it over the life cycle.

The role of procurement

Procurement provides market prices, material metrics and supplier capacities as a basis for decision-making and negotiates target costs in a binding manner with suppliers. A clear procurement policy and governance in category management ensure that target costs, sourcing strategy and the technical specification fit together. This creates shared cost responsibility between engineering and procurement.

Related concepts

Design-to-Cost is closely related to target costing, value analysis and value engineering. While target costing primarily derives price-driven target costs from a market perspective, Design-to-Cost focuses on the technical and design implementation. The two perspectives complement each other and, in practice, belong together in a holistic cost strategy.

Methods and procedure in the Design-to-Cost process

The process typically consists of four steps: deriving target costs, identifying cost drivers, evaluating solution variants and adopting the results in a binding manner. It begins before the start of design work and is continued in milestones through to release for series production.

Deriving target costs

The starting point is the marketable price less the profit margin and overheads. From this, material, manufacturing and development costs are broken down to assembly level. A sound material classification is helpful so that cost drivers such as motors, printed circuit boards or castings can be distinguished from standard parts.

Should-cost analysis and value analysis

The should-cost analysis estimates the manufacturable costs based on material consumption, cycle times, machine rates and surcharges. Value analysis workshops with engineering and procurement examine functions in terms of their cost contribution. Through co-creation with suppliers, process and material ideas from the supply industry are additionally incorporated, such as design simplifications or more cost-effective manufacturing processes.

Tendering and contractual anchoring

Target costs are communicated to suppliers in a binding manner via the tendering strategy. A structured price sheet with material, labour and tooling positions makes quotations comparable and reveals cost drivers. Material-dependent price components such as the alloy surcharge for metal alloys should be agreed early by formula so that target costs remain stable over the term.

Key KPIs and control metrics

Design-to-Cost can only be managed if cost targets are measurable and reported regularly. Typical metrics combine target costs, degree of realisation and delivery performance.

Cost metrics

Key figures are target achievement (actual versus target unit costs), the planned-to-actual variance per assembly and the share of value of material cost savings. In practice, savings targets of single-digit percentage points per project generation are typically pursued. A uniform calculation basis is important, otherwise teams compare apples with oranges.

Implementation and delivery metrics

Cost targets lose their value if deadlines or quality suffer. Therefore, on-time delivery (OTD) at the supplier, the rate of successful sample deliveries in testing and adherence to sampling deadlines should also be measured. The dual-sourcing ratio also shows how resilient the cost position remains in the event of supply failures.

Process metrics

In addition, metrics on process quality prove valuable: the proportion of components with a target cost agreement, the completion rate of value analyses and the duration of change cycles. These figures show whether Design-to-Cost is practised as an established process or merely as a one-off initiative.

Risks and controls in Design-to-Cost

The most common risks are pseudo-optimisation, supply dependencies and a lack of binding effect. Controls must therefore be effective technically, commercially and procedurally.

Technical risks

Material substitutions or thinner wall thicknesses reduce costs but can impair function and durability. Every change requires a check of whether legal requirements are met – for example with a declaration of conformity for the affected assembly. A well-maintained risk register documents technical residual risks and outstanding tasks for each cost measure.

Procurement risks

Aggressive target costs can weaken the supplier base. Whoever enforces single sourcing without transparency across sub-tier levels loses control over quality and availability; rigorous Tier-N transparency management supports this. Precise alignment on the manufacturer part number (MPN) also prevents mix-ups and incorrect orders with functionally identical alternative products.

Control and release

Cost measures should be decided in a binding manner within defined release processes. Digital workflows with mobile release (P2P) accelerate order and change approvals and keep match-and-merge rules for price, quantity and schedule data consistent. Claim management ensures that agreed cost contributions are actually delivered and that deviations are tracked.

Current developments and digitalisation

Design-to-Cost benefits greatly from digital tools: cost estimation, supplier involvement and data consolidation become faster and more transparent. Digital procurement makes cost targets visible and auditable across systems.

Should-cost models and data usage

Parametric cost estimation models based on historical quotations and manufacturing data enable rapid should-cost assessments as early as the concept stage. Well-maintained master data – material classification, MPN references, historical price sheets – is a prerequisite. Without data quality, every cost estimate remains a shot in the dark.

Early supplier involvement

Increasingly, suppliers are involved during the design phase via digital platforms, for example for feasibility checks, quotation bases and sample deliveries. This shortens sampling cycles and makes target costs negotiable before drawings are fixed. A clear tendering strategy for development services is also a prerequisite.

Resilience and sustainability

Today, target costs are frequently supplemented with sustainability and resilience criteria, such as CO2 shares per component or degrees of regionalisation. Design-to-Cost is thus evolving into a design-to-value approach that jointly optimises price, cost, function and sustainability.

Typical metrics

Target achievement for unit costs: $\geq 95\%$

Proportion of assemblies that meet or undercut target costs

Share of value of material cost savings: 3–8% per project generation

Typical guideline for Design-to-Cost programmes in series development

Assemblies with a target cost agreement: $> 90\%$

Shows how comprehensively the process is anchored

On-Time Delivery (OTD) of target cost suppliers: $> 98\%$

Ensures that cost reduction does not come at the expense of delivery performance

Practical example

A medium-sized mechanical engineering company developed a new product range and set binding target unit costs for the main assemblies. Procurement carried out should-cost analyses before design release and invited three suppliers to structured value analysis workshops. An open tender with a detailed price sheet made cost drivers visible; two design simplifications and one material substitution were developed jointly with the suppliers.

- Target costs per assembly defined before the start of design work and incorporated into milestones
- Value analysis workshops with engineering and suppliers to identify cost drivers
- Material and surcharge prices, including the alloy surcharge, agreed by formula in the supply contract
- Implementation safeguarded by a risk register and defined release loops, including sample deliveries

Conclusion

Design-to-Cost shifts cost management to where the greatest lever lies: the early development phase. The approach only works if target costs are binding and procurement, engineering and suppliers work with reliable data. Metrics on target achievement, quality and delivery performance maintain the balance between cost and function. Companies that anchor Design-to-Cost as an established process with clear governance achieve sustainably lower unit and life cycle costs in practice than with retrospective savings programmes. Success stands or falls with data quality and the early involvement of the supplier base.

Frequently asked questions

What does Design-to-Cost mean?

Design-to-Cost is an approach in which target costs are defined early in product development and treated as binding constraints for design, material selection and manufacturing. Costs are thus managed from the outset rather than reduced after the fact. Procurement contributes market prices and supplier knowledge at an early stage.

What is the difference between Design-to-Cost and Target Costing?

Target costing derives target costs from the market price and profit margin and is rather a controlling approach. Design-to-Cost focuses on the technical implementation of these targets in design and manufacturing. In practice, both methods are combined.

What role does procurement play in Design-to-Cost?

Procurement provides should-cost analyses, market price transparency and supplier capacities, negotiates target costs and anchors them in contracts and price sheets. Through co-creation with suppliers, process and material saving ideas are incorporated at an early stage. A clear procurement policy and category governance ensure binding effect.

In which phases is Design-to-Cost most effective?

The greatest lever lies in the concept and design phase, because functions, materials and manufacturing processes can still be freely chosen there. After tooling release, the scope for design changes decreases significantly. Target costs should therefore be fixed no later than before design release.

Which methods are used in Design-to-Cost?

Typical methods include should-cost analyses, value analysis workshops, target costing and functional cost assessment. In addition, structured tenders with detailed price sheets and early supplier involvement are used. Performance is measured using target-achievement and delivery metrics such as OTD.

What are the risks of Design-to-Cost?

Potential risks include quality losses due to over-optimisation, a weakened supplier base from overly aggressive targets and a lack of binding effect without governance. Countermeasures include technical release processes, a risk register, sample deliveries and transparent sub-tier supplier monitoring.