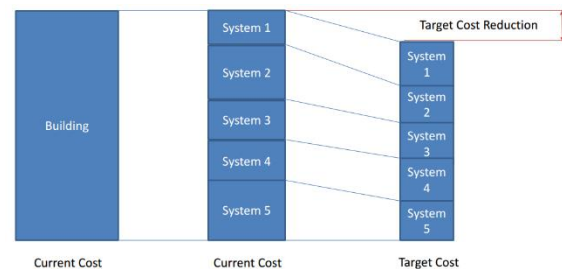
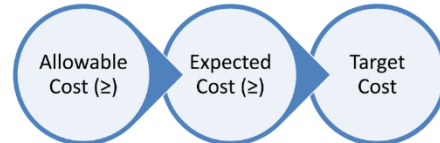


*“TVD is a management practice that drives design to deliver customer values and develops design within project constraints... TVD strives to reduce the waste and rework in the Design/Estimate/Redesign cycle... requires a fundamental shift in thinking from ‘expected costs’ to ‘target costs’... necessarily involves cross functional teams... no one person has all the knowledge... and cries out for an integrated product/process/cost model.” (Glenn Ballard)*

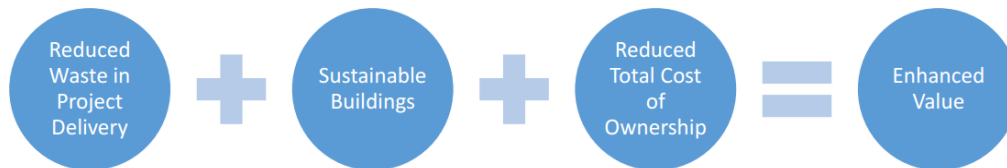
## Key Success Factors

- **TVD = design to a budget not budget to design.**
- **Evaluate business case first** (Ballard).
  - Demand, revenue, Total Cost of Ownership, ROI, maximum funds available.
- If project delivery is not considered risky, fund the project.
- If the project delivery is considered risky, fund a feasibility study.
- **Use Set Based Design** – allowing multiple design options until the last responsible moment and evaluate sets against target values and owner requirements.
- **Produce cost and constructability guidelines for design.** This becomes the “Target Cost”.
- **Target cost typically starts below current market costs.** The idea is that by eliminating waste in the design and construction processes, projects can be delivered for less.
- **Develop cross-functional focus groups for major building systems** – foundation; structure; envelope; site work; MEP; finishes; landscape; speciality services.
  - If one group is over-budget, cost overruns need to be balanced from other focus group budgets.
  - Workshops and A3 problem solving for collaboration, information exchange and innovation sharing.
- **Use Lean tools and practices to collaborate deeply to eliminate waste and add value**
  - Project First mentality – optimize the project not the piece.
  - Use a Big Room for collaborative working practices.
    - Work openly and transparently.
  - Use Last Planner® for design and construction.
  - Integrate BIM into Big Room and Last Planner® sessions.
  - Use Choosing By Advantages decision making system for selecting key components.
- **Use concurrent engineering and rapid conceptual estimating** to eliminate waste (rework) in design (procurement and construction).
- Hold frequent budget alignment sessions.
- Use value engineering proactively and hold design reviews with permitting agencies.
- **The Cardinal Rule: target costs can never exceed the target budget!**
- **Increased owner scope = increased target cost.**
- **Early contractor and speciality trade input at conceptual design stage is essential** – 80% of project costs are locked in by Schematic Design (SD).





- Add value through eliminating design and construction waste and rework
- 50% of design time can be spent on unnecessary design rework.
- 50% of construction rework is a direct result of design changes.
- Indirect costs can be as much as six times the actual cost of rework.
- Rework can account for between 2 – 12% of project costs (Hwang and Yang, 2014).
- **The typical types of design waste:**
  - **Iterative Design:** Designing a concept to a certain stage, then backtracking to explore, refine or design another concept.
  - **Rework:** Design does not meet the target cost or satisfy the performance requirements or is missing information.
  - **Lack of Coordination between Disciplines:** Producing work without consideration for impacts on other areas of the project, or that is not needed or at the wrong time (too early or too late).
  - **Inefficient work flow:** people passing information and documents in large batches or at the incorrect time.
  - **Overdesign of systems:** Lack of consideration for diversity of loads and factors of safety yield oversized systems.
  - **Poor design that generates waste during construction:** Design does not take into account the supply chain or ability to construct the design.
  - **Designing over allowable budget:** Results in rework, scope deletion or diminishment of project quality.



The transition from design to construction needs to be managed carefully to enhance value through reduced waste and ensure that the target cost is achieved or bettered.

### Case studies

- [Between 2009 and 2013, 83% of 11 projects \(avg. value of \\$21.8M\) using TVD met the target cost at the San Diego Community College District averaging 7% below Target Cost.](#)
- [Six projects worth \\$178.5M \(allowable cost\) achieved costs savings relative to market costs of 14.2%.](#)

For more information:

#### Umstot Project & Facilities Solutions, LLC

3755 Avocado Blvd  
La Mesa, CA 91941  
619.201.8483

[www.umstotsolutions.com](http://www.umstotsolutions.com)

[david.umstot@umstotsolutions.com](mailto:david.umstot@umstotsolutions.com)