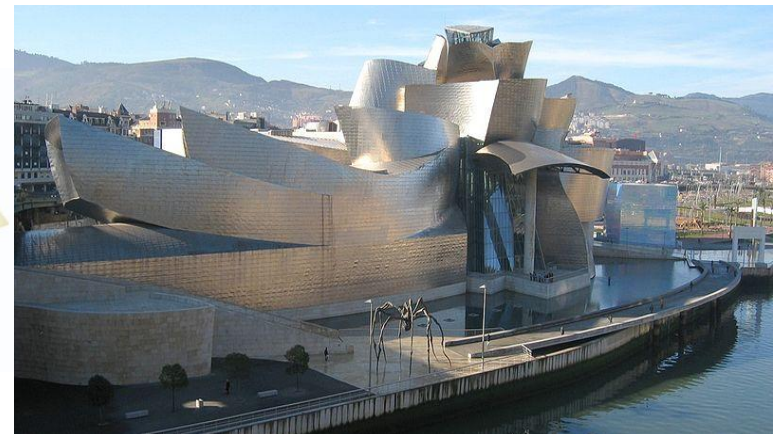


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THE INITIAL COST OF BUILDING PROJECTS

- The **Initial Cost** or **First Cost** of a building, project traditionally has been, and still is, one of the architect's main economic concerns. Most often this takes the form of trying to keep the initial cost within the budget, which is **the amount of money the owner has allocated for the project**.
- The budget itself generally is the result of some earlier estimate. In practical terms, the task presents itself in any situation as that of deriving, from the givens at that stage in the building delivery process some useful guideline for the decisions required at the next stage.
- From these decisions, an estimate of the initial cost must be prepared and compared with the budget.
- If the estimate differs from the budget, either the solution or the budget must be adapted; the problem lies in deciding what changes to make.



Sydney Opera House



Guggenheim Museum, Bilbao

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- For example, consider the situation at the programming stage where a **preliminary budget** may have been established in a prior **feasibility analysis**.
- The feasibility analysis may have been done with some **rough assumption** of how big such a project would be, say, in terms of **square meter of total floor area**. Together with the tentative budget, this is **the given** at this stage.
- The **programming work** now arrives at a **different result** for the total floor area and, correspondingly, at a different cost estimate. If this estimate is higher than the previous budget, the programmer must recommend to the client which elements in the program to change to **bring the cost back to the given budget**—or must get the client to accept a **revised higher budget**. At the schematic design stage, the program, with its assumption about the total floor area and its **program-stage budget**, becomes **the given**.
- Upon producing a **design solution**, the designer makes a **cost estimate** which he or she can compare to this new budget. If the estimate is higher than the budget, **will the client agree** to the higher cost as the revised budget? Or should the solution be changed? If so, what changes should be considered?



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- **The Initial Project Cost:** is the total amount that must be paid for the planning and construction of a building project up to the point of completion or occupancy.
- It is useful to think of this amount as what **an owner would have to pay** at this point if the project were to be paid for in cash, without having to borrow any of it. Adding the cost of borrowing construction funds to that sum (the interest on the amounts borrowed, and the loan fees or "discount points"), we obtain the **Total Initial Project Cost**.
- Throughout these discussions, it will be useful to maintain a consistent distinction between **unit prices**, that is, **the price of one unit** of something (e.g., the price of one square meter of floor material), which often is called the **unit cost**, and **costs**, which are the result of **multiplying the unit prices by the number of units** (e.g., the cost of the entire floor of material is the unit price, TL/m², times the number of square meter of floor area).



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CONSTRUCTION COST
BUILDING CONSTRUCTION COST
SITE WORK COST
OVERHEAD & PROFIT
SITE ACQUISITION COST (LAND COST)
DEVELOPMENT COST
PROFESSIONAL FEES
PERMITS
CARRYING CHARGES
CONTINGENCY ALLOWANCE
FURNITURE & EQUIPMENT COST
MOVING COST
CONSTRUCTION FINANCING COST
PERMANENT FINANCING COST
TOTAL INITIAL PROJECT COST

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- **Project cost:** The initial cost of the project, including all costs incurred up to the point of completion of the building, site, landscaping, etc., to have it ready for first occupancy.
- **Site cost:** The cost of acquisition of the site, also called "land cost."
- **Development cost:** The cost of developing the site, that is, clearing the land, providing roads, utilities, planning permits, impact fees, and so on. It may or may not include the fees and profits of the developer, if there is a developer other than the owner involved.
- **Building cost:** The cost of construction of the building itself. However, there may be other construction costs, for example, parking and driveways, runoff control structures, and so forth, which should be listed separately.



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- **Site work cost:** The cost of all site preparation and improvements, It includes, for example: landscaping cost; parking cost—the cost of providing surface parking and driveways (underground and multi-story parking are counted as part of the building, and their cost is included in building cost); runoff control cost—the cost of providing measures for storm water runoff control, such as retention ponds, swales, drainage ditches, and so on; clearing cost—the cost of clearing the site of trees and shrubs as needed. Other items that must be considered as separate cost positions as applicable are extensive leveling/cut and fill work, draining swamps, fences, signage, outdoor furniture, lighting, fountains, pools, and so forth.
- **Construction cost:** Building construction cost and other construction costs on the site (site work) often are lumped together in one common construction cost position or construction budget.



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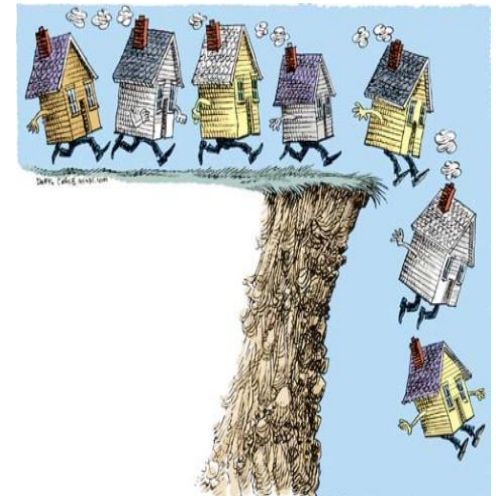
THE INITIAL COST OF BUILDING PROJECTS

- **Fees:** Fees for various professional services, including: architects' and engineers fees; legal fees; accounting fees; fees for special consultants' services, such as financial feasibility analysis, marketing, facility programming, and project management, as well as special surveys soil tests, and, for larger projects, environmental or regional impact studies.
- **Cost of permits:** The cost of permits of various kinds, including the building permit, tree removal permit, development permits, permits for sewage disposal, septic tanks, signage, and so on, as required by applicable regulation
- **Carrying charges:** The various costs associated with owning, maintaining, and keeping the site in order before and during construction, including such items as: real estate taxes (property taxes); site maintenance; site security cost, which may include fencing, security personnel, and temporary lighting. Management and accounting costs, insurance, temporary utility hookup charges, and the like all would fall in this category, unless specifically included in the construction contracts for site preparation and general conditions.



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- **Interim financing costs (construction financing):** Costs that normally consist of interest charges on the construction loan, "discount points" or loan fees, and possibly other fees associated with the process of arranging for financing. At completion of the building, the construction loan together with any remaining interest will be converted into the long-term mortgage or "permanent" financing,
- **Permanent financing costs:** The costs associated with obtaining permanent financing (usually in the form of a mortgage) for a project. There will be appraisal costs, closing costs, and again "discount points" or loan fees charged by the lender up front. The interest on permanent financing will not be counted in the initial cost.



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- **Overhead and profit:** Charges which depend very much on the specific ownership situation for each project, and the relationship arrangements among the owner, developer (if any), general contractor, and subcontractors. **Unless the owner acts as the developer, there will be overhead and profit charges for any intermediate firm providing the services of the developer.** Even if there is no intermediate developer, for larger projects this will take the form of **costs of personnel** assigned within the owner's organization to the tasks of managing the project. These costs often are overlooked in early estimates, and if inadequate planning and budget provisions are made for such management, project management difficulties are likely to arise. **If separate firms are employed for this purpose, the associated costs might be labeled "management fees" and assigned to the "fees" category.**
- **Equipment cost:** The cost of necessary fixed and movable equipment and furniture. A further distinction usually is made between fixed equipment and movable furnishings.



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- Contingency funds:** A certain amount of money that must be set aside for unforeseen costs that may arise during the planning and construction process. The likelihood of such costs arising varies from project to project. If it is a routine one, with standard conditions and construction methods, it can be kept low. **As more unknown, experimental, or innovative features are involved, more contingency funds should be set aside.** Note that contingency funds should be provided at several levels: first at the **building construction level** (within the building construction cost and site work cost) and then at the **overall project level** within the project cost, for unforeseen costs that may arise in areas other than construction.
- Moving costs:** The cost associated with moving the client's belongings and operations into the new building. This may include not only the costs of the actual moving process but also the costs incurred because of loss of income during the transition-
- Total Initial Project Cost:** The sum of all initial costs for the project, including interim or construction financing and up-front permanent financing charges.



$$\begin{aligned}
 \Delta \mathbf{x} &= \mathbf{x}_f - \mathbf{x}_i & \Delta \mathbf{v} &= \mathbf{v}_f - \mathbf{v}_i & \mathbf{v} &= \sqrt{v_x^2 + v_y^2} & \theta &= \tan^{-1} \left(\frac{v_y}{v_x} \right) \\
 \bar{\mathbf{v}} &= \frac{\Delta \mathbf{x}}{\Delta t} & \bar{\mathbf{a}} &= \frac{\Delta \mathbf{v}}{\Delta t} & \mathbf{v}_x &= v \cos(\theta) & \mathbf{v}_y &= v \sin(\theta) \\
 \mathbf{v} &= \mathbf{v}_0 + \mathbf{a}t & \mathbf{x} &= \mathbf{x}_0 + \mathbf{v}_0 t + \frac{\mathbf{a}t^2}{2} & \mathbf{x} &\rightarrow x, y & \mathbf{x}_0 &\rightarrow x_0, y_0 \\
 v^2 - v_0^2 &= 2\mathbf{a} \cdot (\mathbf{x} - \mathbf{x}_0) & \mathbf{v} &\rightarrow v_x, v_y & \mathbf{v}_0 &\rightarrow v_{0x}, v_{0y} & \mathbf{a} &\rightarrow a_x, a_y \\
 \bar{\mathbf{v}} &= \frac{\mathbf{v}_f + \mathbf{v}_i}{2} & \Delta \mathbf{x} &= \bar{\mathbf{v}} \Delta t & \mu N &= \frac{v^2}{R} & \mathbf{v} &= \lambda f \\
 F_{\text{tot}} &= m \mathbf{a} & E &= K + U & \Delta Q &= (\text{quant}) C_{\text{const}} \Delta T & \Delta S &\geq 0 \\
 W &= F d & E_i &= E_f & \Delta Q_{\text{int}} &= \Delta W_{\text{by}} + \Delta E & \Delta Q &= 1 \Delta(\text{quant}) \\
 W_{\text{tot}} &= \Delta(KB) & \frac{1}{2} m v^2 & & C_p &= C_v + R & e &= \frac{\Delta W}{\Delta Q} \\
 \Delta U &= -W_{\text{if}} & x &= A \cos(\omega t) & \text{deg. freedom} & & e &= 1 - \frac{T_L}{T_H} \\
 \frac{1}{2} k x^2 &= \frac{1}{2} \frac{k}{m} & x &= A \cos(\omega t) & & & M &= \rho V \\
 p &= m v & v &= A \omega \sin(\omega t) & & & P_1 &= P_2 \\
 \bar{P}_{\text{net}} &= \bar{P}_{\text{prod}} & a &= A \omega^2 \cos(\omega t) & & & \Delta P &= \rho g \Delta h \\
 \left(\sum_j m_j \mathbf{v}_j \right)_{\text{tot}} &= \left(\sum_j m_j \mathbf{v}_j \right)_{\text{prod}} & & & & & B &= \rho_{\text{liq}} V_{\text{disp}} g \\
 & & & & & & A_1 v_1 &= A_2 v_2 \\
 & & & & & & P + \frac{1}{2} \rho v^2 &= \text{const.}
 \end{aligned}$$

$$\text{TIPRJCST} = \text{PRJCST} + \text{CFINCST} + \text{PFINCST} \quad (2-1)$$

where:

TIPRJCST = Total Initial Project Cost

PRJCST = Project Cost

CFINCST = Construction financing cost

PFINCST = (Up-front) Cost of arranging permanent financing

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$$\text{PRJCST} = \text{SCST} + \text{DEVCST} + \text{SWCST} + \text{BLDCST} + \text{FEES} + \text{PRMCST} + \text{CARCH} + \text{OHP} + \text{CONT.} \quad (2-5)$$

where:

SCST = Site cost (land acquisition cost)
DEVCST = Development costs
SWCST = Site work cost
BLDCST = Construction cost of building
FEES = Professional and other fees
PRMCST = Costs of permits
CARCH = Carrying charges
OHP = Overhead and profit
CONT = Contingency allowance

$$\text{BLDCST} = \text{TFA} * \text{BLDPRC} \quad (2-6)$$

where:

TFA = Total (gross) floor area of the building
BLDPRC = Building construction unit price (\$/sf of TFA)

$$\text{TIPRJCST} = \text{PRJCST} + \text{CFINCST} + \text{PFINCST} \quad (2-1)$$

where:

TIPRJCST = Total Initial Project Cost

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$$CFINCST = CLINTAMNT + CLOANFEE \quad (2-7)$$

where:

CLOANFEE = Loan fee or “discount points” for the construction loan

CLINTAMNT = Amount of interest charged for the outstanding balance of the construction loan

$$CLINTAMNT = AVOB * CLINT * CPER \quad (2-8)$$

where:

AVOB = Average Outstanding Balance of construction loan

CLINT = Construction loan interest rate

CPER = Construction period

Note: CLINT and CPER must be expressed in terms of the same time units. If CPER is expressed in months, CLINT (usually quoted as an annual rate) must be converted to a monthly rate also.

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$$AVOB = CLOAN * AVBALPC \quad (2-9)$$

where:

CLOAN = Construction loan

AVBALPC = Percentage of the loan assumed to be outstanding, on average, during construction

$$CLOAN = CLVR * PRJCST \quad (2-10)$$

where CLVR is the loan-to-value ratio for the construction loan, the percentage of the project cost the bank is willing to lend.

Of course, the remaining components of equation (2-5) also must be calculated in detail, according to the applicable conditions of each project. The main concern for the architect is likely to be the building cost,

$$\text{TIPRJCST} = \text{PRJCST} + \text{CFINCST} + \text{PFINCST} \quad (2-1)$$

where:

TIPRJCST = Total Initial Project Cost

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$$P_{\text{FNCST}} = M_{\text{LOANFEE}} + C_{\text{LSCST}} \quad (2-2)$$

where:

C_{LSCST} = Closing costs—the various fees and charges associated with arranging for the permanent financing

and:

$$M_{\text{LOANFEE}} = M_{\text{LOAN}} * D_{\text{ISCPTS}} \quad (2-3)$$

Here M_{LOANFEE} or “discount points” is the amount charged by the lender for the mortgage loan (a percentage of the loan).

$$M_{\text{LOAN}} = P_{\text{RJVAL}} * M_{\text{LVR}} \quad (2-4)$$

P_{RJVAL} is the assessed project value; for new construction it often is assumed equal to the project cost. M_{LVR} is the loan-to-value ratio for the mortgage loan—the fraction of the project value that the bank is willing to lend, with the remainder to be put up by the owner as equity.

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- The variety of the cost items that make up the total initial project cost for a building project may be surprising to someone unfamiliar with their scope. In currency amounts, too, these items "add up," as a simplified example of an actual project shows. By the time all is done, the total cost is nearly twice that of the building alone; or, in terms of cost per square meter of total floor area, if the construction cost for the building itself is assumed as 100 TL, the cost per square meter including all the other charges is going to be about 200 TL, or more.
- Because the contribution of these other costs to the total is so significant, the architect must pay close attention to them as well—especially those that directly or indirectly are linked to the architect's decisions, as many are. The connection is not always so easily seen and understood as that of the architect's fees, being calculated as a percentage of the construction cost—a connection most clients readily understand, and which for some is a reason, justified or not, for suspecting that the architect is less serious than he or she claims to be about trying to keep construction cost down.



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- Which items are directly influenced by the interior architect's decisions? Clearly, the **building construction cost** will be at least to the extent that architectural decisions determine overall area, building complexity, and so on.
- A second group of decisions has to do with **trade-offs between land use and building form**, sometimes even relating to how much land will be needed. Whether parking is placed on ground or under or inside the building can make a huge difference, for example.
- Third, all those items that are calculated/estimated as a percentage of building construction cost are clearly but less directly related to the architect's decisions.
- There are other significant but less obvious influences. One such factor has to do with time—specifically, the total time needed for project delivery and the construction period. If the architect can select construction materials and methods, contractual arrangements, and so forth, that shorten these periods, these choices will reduce the extent of price increases due to inflation between the time of the estimate and project completion; they also will reduce the amount of interest the client must pay for the construction loan.

