



Research Methods in Science in Engineering

# Project Budgets for Federally Funded Research

Slide 1

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## What Costs Money?

- Salaries
- Materials and supplies
- Travel to conferences and the customer
- Equipment purchases
- Software and licenses
- Consulting fees
- Publications and posters
- **Benefits and overhead**

The EMPossible logo, consisting of the stylized geometric icon and the text "EMPossible" in blue and green.

Slide 2

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## Total Direct Labor (TDL)

Direct labor costs include all of the money that is directly paid to employees in their paycheck.

	<i>R</i>	<i>H</i>	<i>R · H</i>
Person	Hourly Rate	Hours to Work	Cost
Kelly Sánchez	\$20	40	\$800
Pedro Garcia	\$20	2080	\$41,600
<b>TOTAL:</b>			<b>\$42,400</b>

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## Fringe Benefits

While not directly in the paycheck, employees also get fringe benefits.

- Health insurance
- Worker's compensation
- Retirement plans
- Sick leave
- Family and medical leave
- Subsidized meals
- Commuter compensation
- Paid vacation

This is typically calculated as a percentage of the employee's salary.

$$\begin{array}{r}
 \text{Total Direct Labor (TDL): } \$42,400 \\
 \text{Fringe Benefits Rate: } 33\% \\
 \hline
 \text{Fringe Benefits: } \$13,992 \quad = \text{rate} \times \text{TDL} \\
 \text{TOTAL COST OF LABOR: } \$56,392
 \end{array}$$

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## Total Direct Cost (TDC)

Total direct cost (TDC) includes everything that an organization will have to pay for during a project.

TOTAL COST OF LABOR:	\$56,392
Materials & Supplies:	\$1,022
Equipment:	\$286,000
Travel:	\$4,299
<b>TOTAL:</b>	<b>\$347,713</b>

## Materials & Supplies

Materials and supplies are the smaller and consumable items that must be purchased to execute the project. The materials purchased by a project can only be used by that project. A breakdown of materials and supplies costs is typically required in a proposal.

MATERIALS & SUPPLIES BREAKDOWN				
Item	Qty.	Price Per	Cost	Notes
Dielectric Slabs	4	\$25.00	\$100.00	<a href="#">See attached quote</a>
Thermocouples	50	\$11.95	\$597.50	<a href="#">See attached quote</a>
Adhesives	5	\$15.00	\$75.00	<a href="#">See attached quote</a>
Consumables: gloves, masks, etc.	1	\$250.00	\$250.00	<a href="#">Engineering estimate</a>
<b>TOTAL:</b>			<b>\$1,022.50</b>	

## Capital Equipment

Federal law requires that equipment purchased by a project has to be specifically needed by that project, can only ever be used by that project, and may be collected by the customer at the end of the project. Equipment must cost more than \$10,000 and have an operational lifetime over three years. Equipment for generic use by the organization must be purchased out of profit or from the overhead.

Typically, a breakdown of the equipment to be purchased and a justification of cost is required in a proposal. Justification is typically a quote, or competitive quotes from multiple vendors.

CAPITAL EQUIPMENT				
Item	Qty.	Price Per	Cost	Notes
High Performance Computers	2	\$12,000	\$24,000	See attached quote
nScript 3D Printer	1	\$250,000	\$250,000	See attached quote
Oscilloscope	1	\$12,000	\$12,000	See attached quote
<b>TOTAL:</b>			<b>\$286,000</b>	

## Travel

Travel expenses must be justified. Expenses include airfare, car rental, hotel, Uber/taxi services, food, and others. Food expenses cannot exceed per diem. Alcohol is not a reimbursable expense.

<https://www.gsa.gov/travel/plan-book/per-diem-rates>

TRAVEL BREAKDOWN		
Trip #1 -- IEEE Conference	#	Justification
Number of People	2	
Number of Days	4	
Airfare (two way per person)	\$600	See attached quote
Total Airfare:	\$1,200	(# people)*(\$ airfare)
Per Diem (per day)	\$153	Orlando, Florida. March 2022, Federal Per Diem Rates
Total Per Diem:	\$1,224	(# people)*(# days)*(\$ daily per diem)
Lodging (per night)	\$200	See attached quote
Total Lodging:	\$1,600	(# people)*(# days)*(\$ nightly rate)
Car Rental / Transportation	\$275	Total cost for trip
<b>TOTAL:</b>	<b>\$4,299</b>	<b>Airfare + Per Diem + Lodging + Car</b>

## Total Cost

Total cost is the dollar amount that an organization charges the customer.

Total Direct Cost (TDC):	\$347,713	
Overhead Rate:	49.50%	
Total Overhead:	\$172,118	= rate × TDC
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<b>SUBTOTAL:</b>	<b>\$519,831</b>	
Fee Rate:	7%	
Fee:	\$36,388	= rate × subtotal
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<b>SUBTOTAL:</b>	<b>\$556,219</b>	

## Overhead

Overhead includes all expenses related to doing business that is not directly attributed to a project.

- Building lease/rental
- Electricity and utilities
- General purpose computers
- Secretary and administration
- Office supplies
- Etc..

An organization must predict overhead expenses for the coming year. If they underestimate, they have to eat the expenses. If they overestimate, they have to pay back the government for overcharging.

It is very important to estimate overhead accurately. Companies invest a lot of money to estimate their overhead and how to apply it to contracts.

## Modified Overhead

Many organizations use a modified overhead model. Some examples are:

- Overhead is only charged to the first \$10k of equipment
- Overhead is only charged for the first \$25k of a subaward
- Other such adjustments that more accurately convey how overhead is spent.

## Fee

For-profit organizations are usually allowed to charge a fee up to 7% of the total cost of the project.

Universities are generally not allowed to charge a fee.