

Capital Program Management

Forecasting timelines and cash flow from historical project data



01 Project Background

UCSD Health's CPM team oversees a multi-billion dollar portfolio of construction projects. Without predictive tools, PMs rely on intuition when forecasting timelines and cash flow to stakeholders.

Working with Executive Director Chris Hickman, we turned 14 years of eBuilder spending data into reusable forecasting models – accessible via a web tool.

228

Projects

\$6.6B

Portfolio

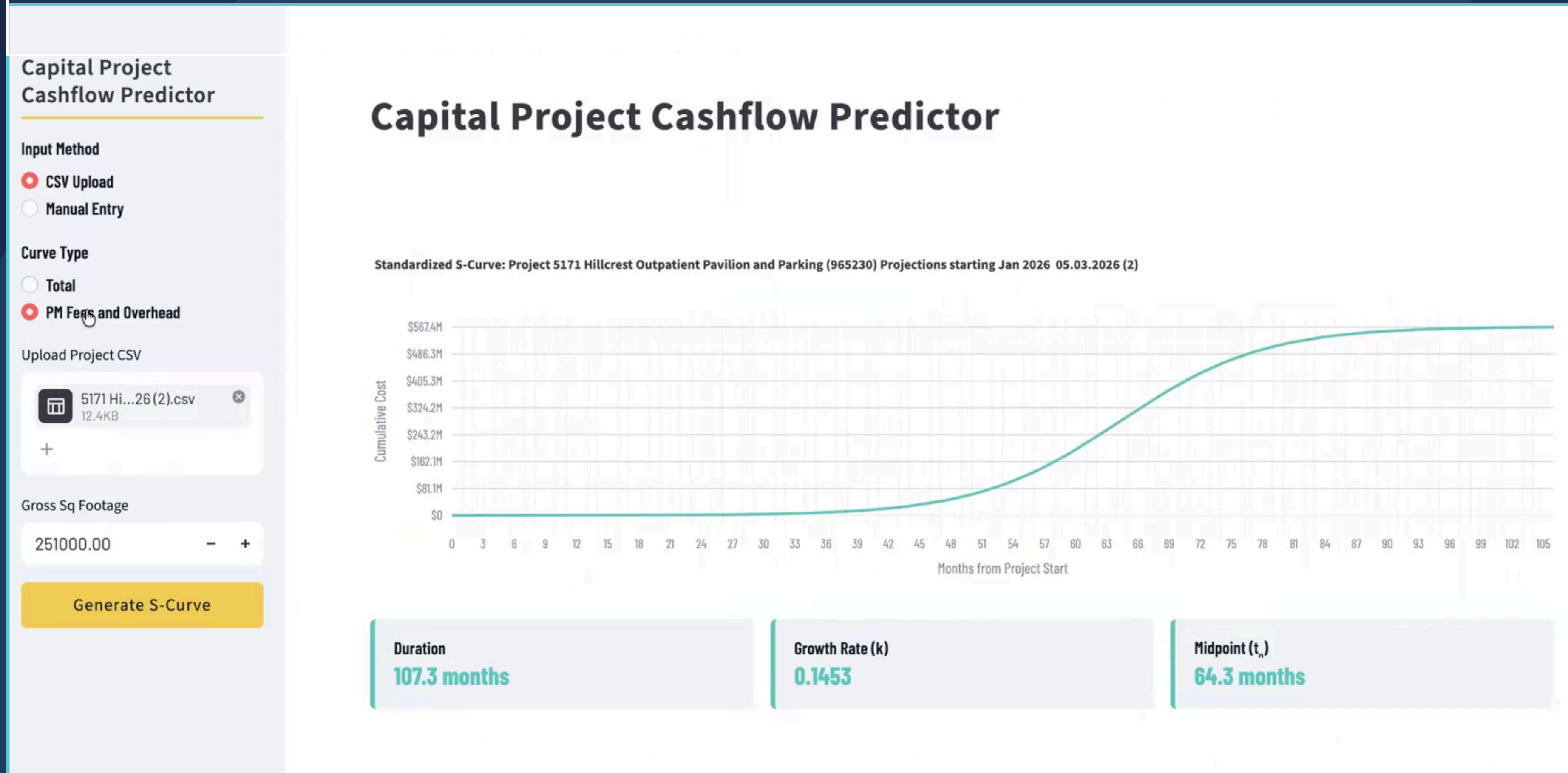
02 Aims & Objectives

- Develop S-curve cash flow models by project size tier
- Classify portfolio: Small / Medium / Large / Mega
- Quantify CPM overhead (Line 6) as % of total cost
- Build PM-facing web tool: budget + sq ft → predicted spend curve

05 Outcomes & Deliverables

- Built an interactive tool that predicts project timelines and cost curves
- Trained on 14+ years of data from 200+ projects (\$6.6B+)
- Generates project-specific forecasts based on size and budget
- Visualizes how spending evolves over time through dynamic cost curves

Virtual Tutorial :

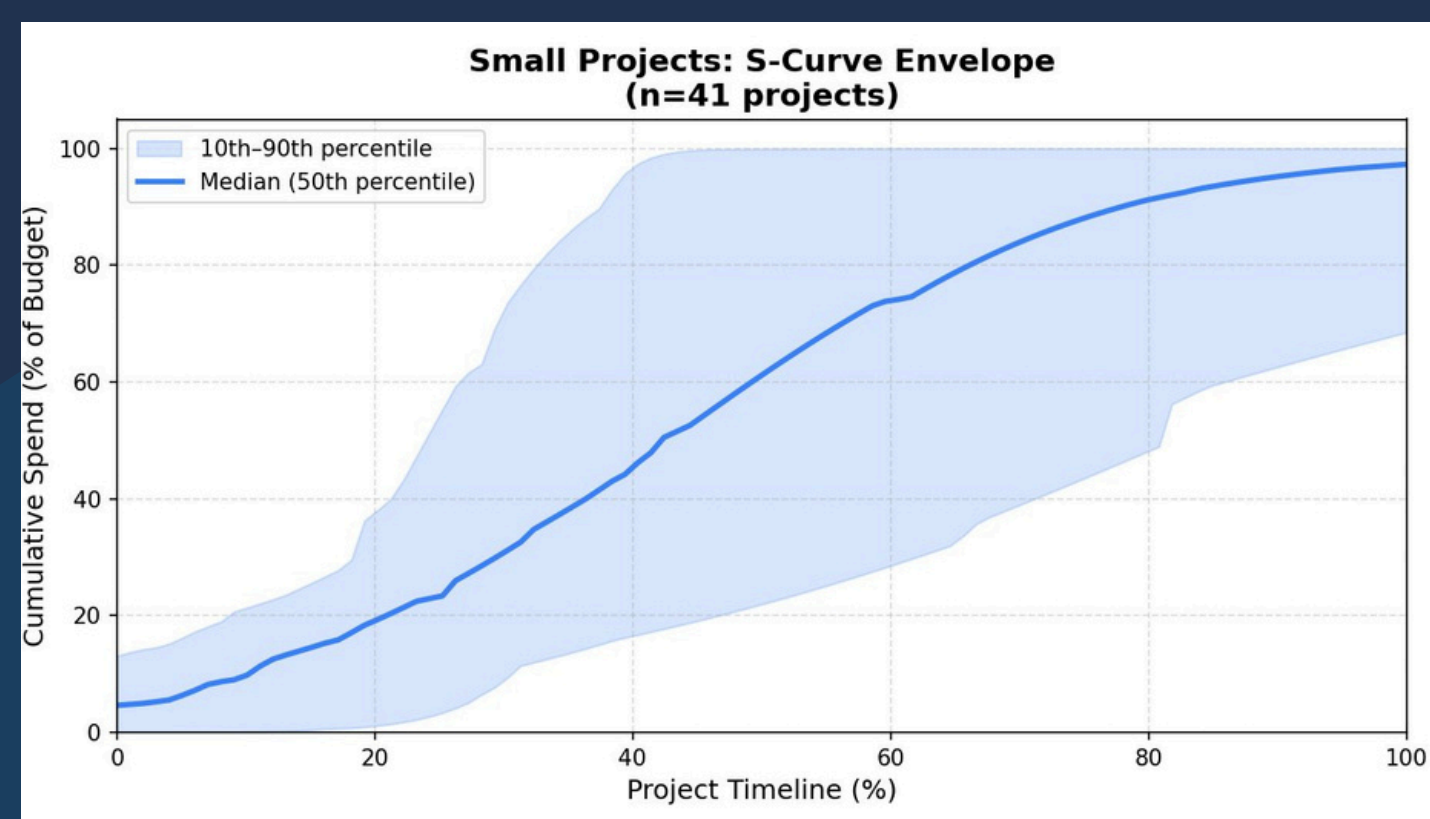


03 Project Journey & Milestones

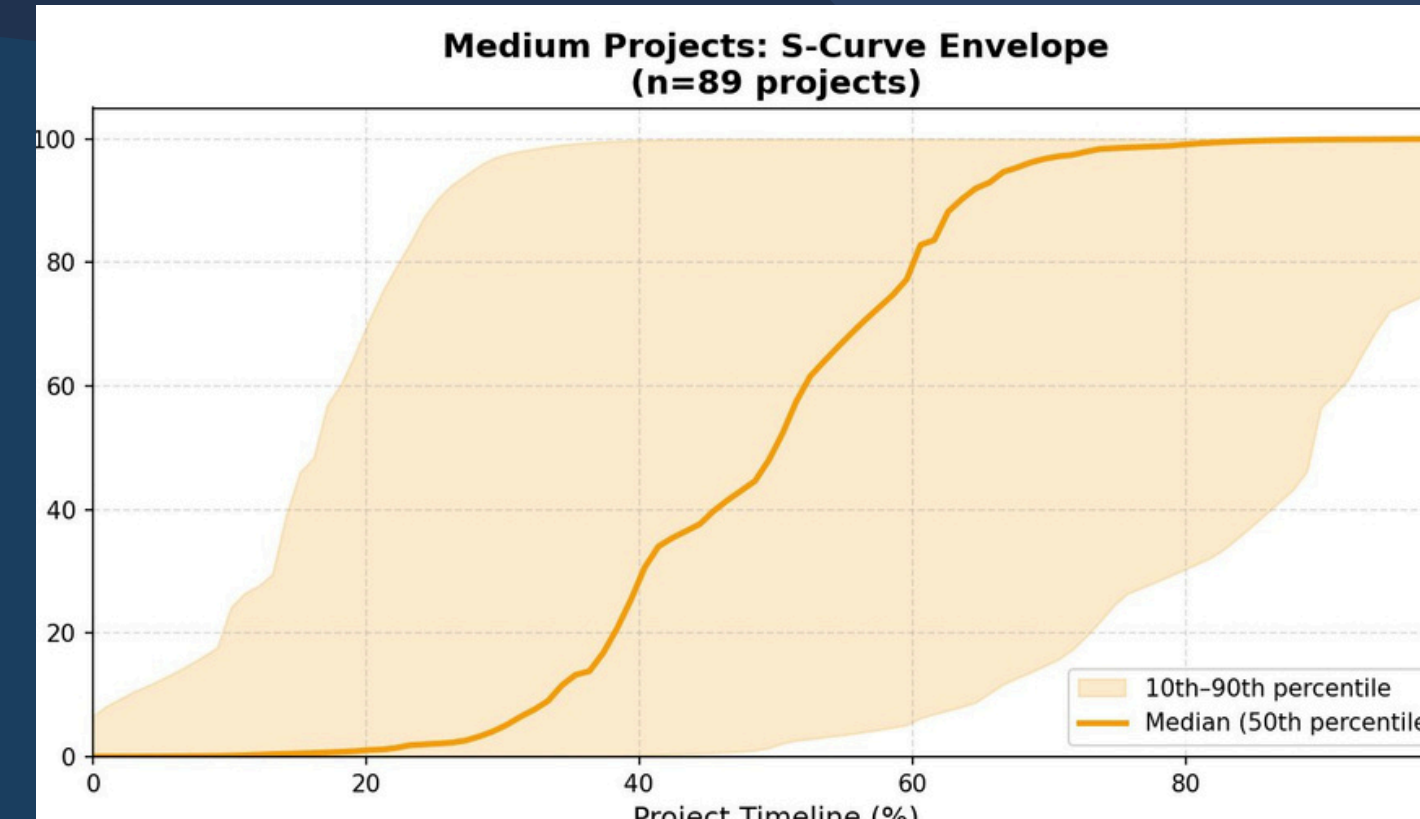
- Dec 2025** **Discovery & Kickoff**
Met with Chris Hickman to define scope. Mapped data sources, aligned on deliverables: predict project duration and cash flow curves from 14 years of internal eBuilder data.
- Jan 2026** **Data Intake & Cleaning**
Parsed eBuilder spreadsheets. Identified 869 complete projects. Isolated 228 with gross sq ft data for model training. Standardized IDs and monthly spend columns.
- Feb 2026** **Baseline EDA & Tier Classification**
Formalized Sm/Med/Lg/Mega tiers. Median duration ranges from 18 months (Small) to 67 months (Mega).
- Mar 2026** **S-Curve Model Development**
Fit logistic S-curves per project. Extracted k (growth rate) and t_0 (spending midpoint). Total R^2 's: $\sim 0.62, \sim 0.76$
- Apr 2026** **Line 6 Overhead Analysis**
CPM internal costs as % of total spend. Key finding: overhead drops from 39% (Small) to 1% (Mega).
- May 2026** **Capital Project Cashflow Predictor**
Integrated sq ft as primary feature. RandomForest and LightGBM, model ensemble. Deployed Capital Project Cashflow Predictor.

04 — Core Deliverable S-Curve Cash Flow Envelopes by Tier

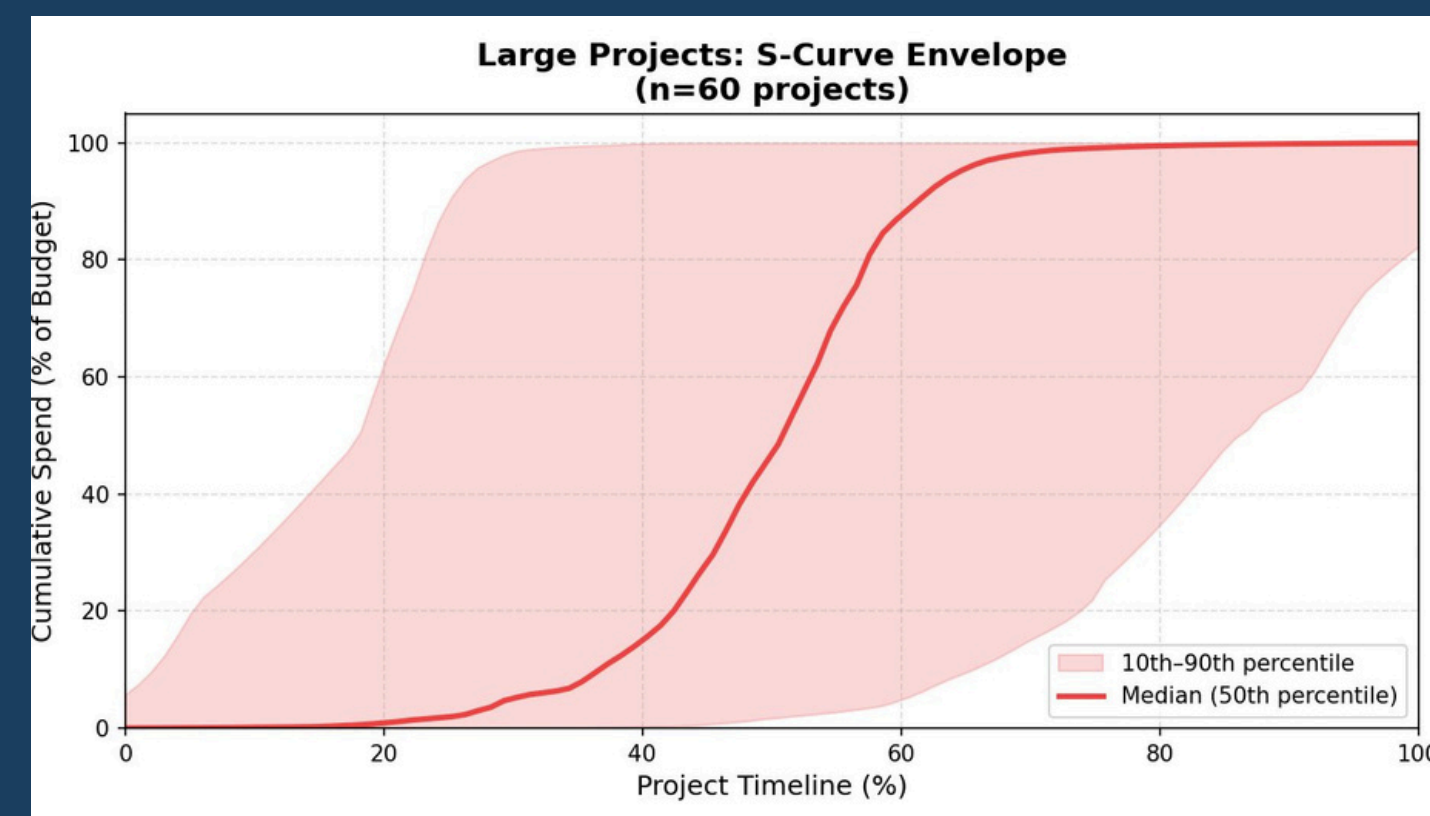
Logistic model fit · Median + 10th–90th pct band · Total R^2 's: $\sim 0.62, \sim 0.76$



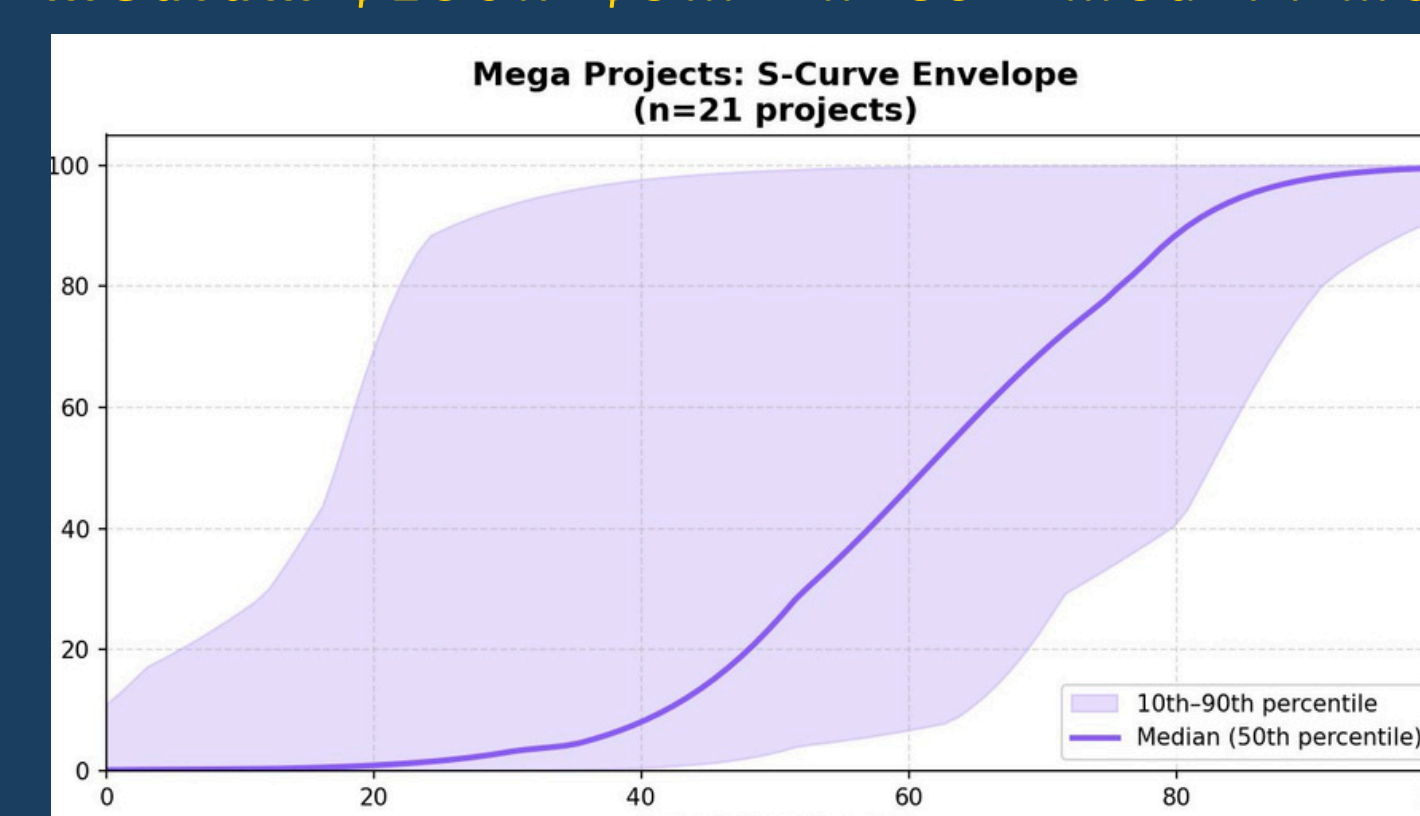
Small <\$250K · n=41 · med 18 mo



Medium \$250K–\$5M · n=89 · med 44 mo



Large \$5M–\$50M · n=60 · med 54.5 mo

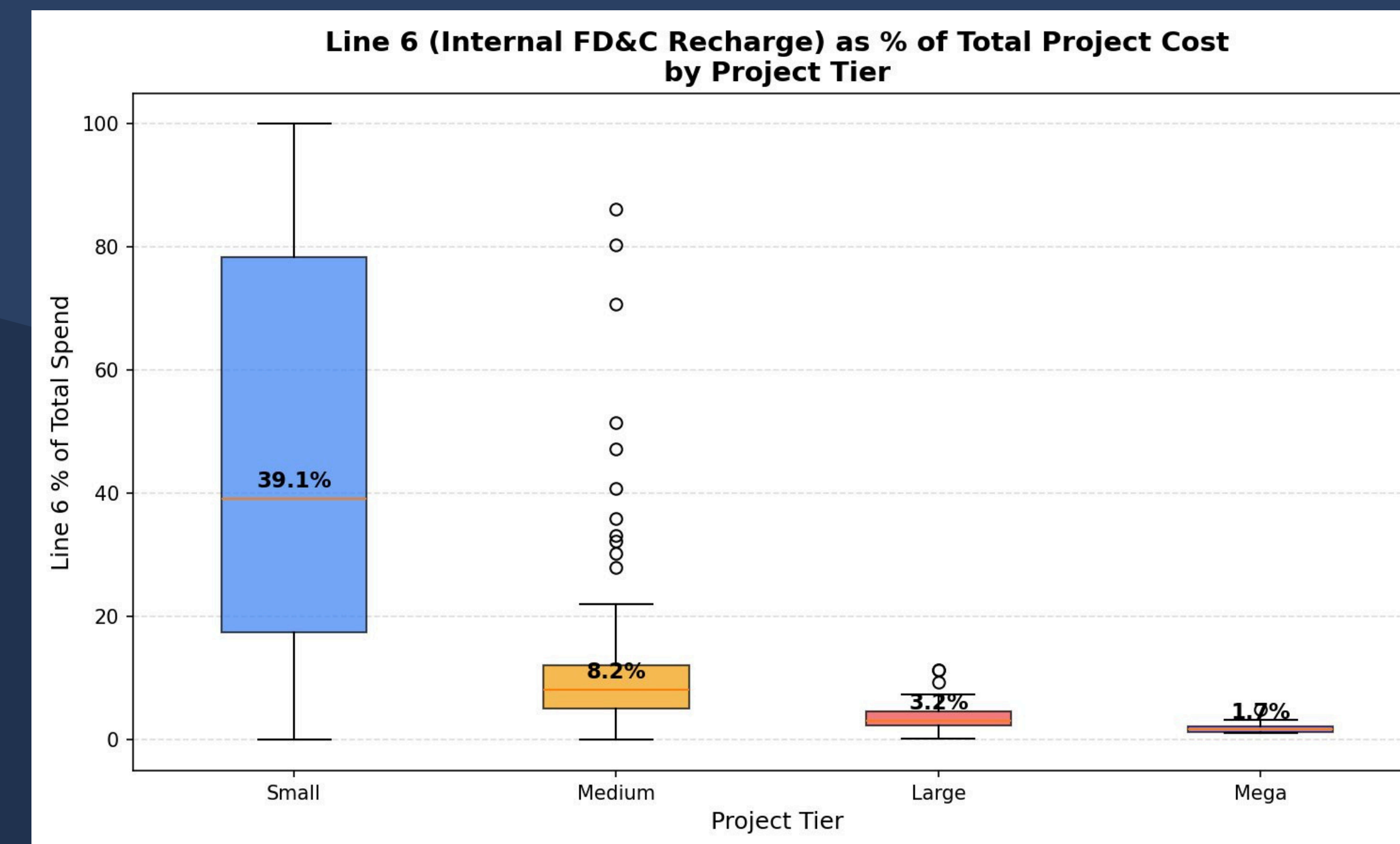


Mega >\$50M · n=21 · med 67 mo

Line 6 — FD&C Internal Overhead

CPM Overhead as % of Total Cost

As project scale grows, internal CPM fees become a smaller share — enabling upfront fee estimates.



39.1%
Small

8.2%
Medium

3.2%
Large

1.7%
Mega

06 Learning Outcomes

- Applied ensemble ML to real institutional data
- Navigated 14yr multi-format eBuilder data
- Stakeholder communication w/ exec leadership
- Shipped a production tool used by CPM team



07 Next Steps

- UC System Expansion — Scale to all UC campuses
- Higher Level Analysis - Integrated with NLP and Descriptions

Quick Estimate

New Construction · 50,000 sq ft · La Jolla, CA 2025

Early-stage ballpark only — the UCSD model has $\pm 82\%$ error at this input fidelity. Triangulate all three sources. For formal estimates, use the S-Curve Generator with eBuilder line-item data.

UCSD HISTORICAL	64 similar projects	CA REGIONAL BENCHMARK	AJ MARKET ESTIMATE
Total EAC	\$34.39M	LOW: \$22.50M MID: \$35.00M HIGH: \$55.00M	LOW: \$35.00M MID: \$40.00M HIGH: \$45.00M
Line 6 (PPM Fee)	\$470K	\$450/sqft \$700/sqft \$1100/sqft	\$350/sqft \$400/sqft \$450/sqft
Predicted Duration	57 mo	Duration Range: 30–84 mo	Duration Range: 24–36 mo
P25: \$3.98M Median: \$9.59M P75: \$45.18M		DGS CCCCI + ENR LA + San Diego coastal adjustment (2024-2025)	*Estimates are based on historical data and industry benchmarks for institutional projects in San Diego, considering the unique requirements and complexities of the UC San Diego campus. La Jolla, CA context - Groq free tier