ICEAA International Cost Estimating & Analysis Association

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2025 ICEAA Cost Challenge
Technomics, Inc.

What Would it Cost to Relocate and Accelerate the Olympics?

Should the 2028 Olympic Games Move from Los Angeles to Atlanta and Should They Be Accelerated to 2027?

- In 2017, Los Angeles was awarded the bid to host the 2028 Summer Olympics.
- In early 2025, California faced one of its worst wildfire seasons, raising concerns about infrastructure, air quality, and public safety.
- Amid mounting pressure – on April 15, 2025 – the International Olympic Committee (IOC) and the United States Olympic & Paralympic Committee (USOPC) formed the **Olympic Relocation & Acceleration Committee (ORAC)** to explore **relocating** the 2028 Games to Atlanta.
- Atlanta emerged as a credible alternative with its successful 1996 Olympics, a world-class airport, and existing venues.
- However, Georgia's role as a battleground state in the 2028 U.S. presidential election raised concerns about strain on emergency and security resources.
- To avoid overlap with the election, the ORAC was asked to also explore **accelerating** the Games to 2027.

So Why Atlanta? The Two Cities Share a Lot in Common.

Los Angeles, CA

- 2nd Busiest Airport in the US
- Entertainment & Film Industry
- Sports Capital
- Cultural & Economic Hub
- Hosted 1984 Olympics

Atlanta, GA

- Busiest Airport in the US
- "Hollywood of the South"
- Cultural & Economic Hub
- Sports Capital
- Hosted 1996 Olympics

To Inform Their Decision, The ORAC Asked Us – How Much Would It Cost?

The ORAC requested an **independent cost estimating team** to:

Estimate the cost of relocating the Olympics on an accelerated timeline.

Estimate the cost to **relocate** the next Summer Olympics from host city Los Angeles to Atlanta and **shift** the Games from Summer 2028 to Summer 2027.

Determine what it would take to fast-track preparations and **successfully** move the LA Olympics to a city with its own unique challenges and opportunities.

- The purpose of the estimate is to inform the ORAC's decision on whether this relocation and acceleration should happen.
- The estimating team was granted four weeks to develop, deliver, and present this quick-turn estimate the ORAC.

To Inform Their Decision, The ORAC Asked Us – How Much Would It Cost?

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Possible Interpretations

Option 1: Simplification

"What would it cost to host the Olympics in Atlanta in 2027?"

Pros: Simple

Cons: Ignores request language

Option 2: Two Separate Questions

"What would it cost to relocate?"

"What would it cost to accelerate?"

Pros: Divides into intuitive components

Cons: Assumes independence (more later), not aligned to decision

Option 3: One Question Focused on the Decision

"What would it cost to relocate and accelerate?"

Pros: Strong alignment with request language and decision, can be used to answer the question in option 1 too

Meet the Independent Cost Estimating Team for the ORAC

Shar Rayhan

Team Captain

Economic Analyst with three years of experience in portfolio, schedule, and supply chain modeling & analysis

Hannah Lee, PCEA®

Cost Lead

Lead Cost Analyst with two years of cost estimating experience for the U.S. Department of Energy

Matt Siiro

Data Lead

Lead Data Analyst with two years of cost estimating experience supporting the U.S. Department of Energy

Jonathan Caldwell-Dafoe

Cost Analyst

Lead Cost Analyst with three years of cost estimating experience in Canada

Annie Meenan

Data Analyst

Senior Associate with two years of cost estimating experience supporting the U.S Department of Energy

Alex Wekluk

Mentor

Technical Director with twenty years of experience and a knowledgeable SME on cost, risk, and systems engineering for US & Canadian aerospace

It Will Cost $675M to Relocate & Accelerate the Olympics. We Will Tell You How We Came to This Number.

$675M

Cost to Relocate and Accelerate

$10.3B

Total Cost to Host the Olympics in Atlanta in 2027

Agenda

- Ground rules & assumptions (GR&As)
- Estimate structure
- Cost elements overview
- Data sources
- Data gathering approach
- Techniques & methods
- Results
- Risk & uncertainty analysis
- Sensitivity analysis
- Phasing analysis
- Recommendation to the ORAC

Some Key Terms and Stakeholders to Know

Acronym	Name	Description
LA28	Los Angeles 2028 Summer Olympics	
***ATL27**	Atlanta 2027 Summer Olympics	
IOC	International Olympic Committee	The supreme authority of the Olympic Movement. It organizes the modern Olympic Games and governs global Olympic policies.
NOCs	National Olympic Committees	National bodies responsible for developing and protecting the Olympic Movement in their respective countries.
USOPC	United States Olympic & Paralympic Committee	The NOC for the U.S., responsible for selecting and funding Team USA for the Olympic and Paralympic Games. Formerly just "USOC."
OCOG	Organizing Committee for the Olympic Games	A temporary committee established by the host city/country to plan and deliver a specific Olympic Games. Includes representation from the IOC, NOC, and local city/state officials.
***ORAC**	Olympic Relocation and Acceleration Committee	Task force established in April 2025 in response to the LA28 relocation and acceleration to ATL27. This body is responsible for making the decision for the relocation and acceleration.

** Newly created terms*

We Followed the GAO 12 Step Process to Promote a Reliable Estimate

Initiation & Research	Assessment	Analysis	Presentation
1. Define the estimate's purpose 2. Develop the estimating plan	3. Define the program 4. Determine the estimating structure 5. Identify ground rules and assumptions (GR&A) 6. Obtain the data 7. Develop the point estimate	8. Conduct sensitivity analysis 9. Conduct risk and uncertainty analysis	10. Document the estimate 11. Present the estimate to management for approval 12. Update the estimate to reflect actual costs/changes

To promote the development of a high-quality cost estimate that is **comprehensive**, **well-documented**, **accurate**, and **reliable**, the team followed the Government Accountability Office (GAO) 12 Step Cost Estimating Process.

Throughout this presentation, the graphic at the bottom of the slides will indicate the step(s) in the process that are presented in the contents of the slide.

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GR&A, Data Sources

We Bounded Our Estimate Through Some Guiding GR&As

Ground Rules	▪ "Successfully relocate and accelerate" – Olympic requirements will remain unchanged between LA28 and ATL27 (e.g., number of sports, events, athletes, visitors). ▪ "Estimate the cost of relocating and accelerating" – Our analysis will focus on the *additional* costs resulting from the relocation and acceleration. However, for comparison, we will also provide a total cost to host in Atlanta in 2027. ▪ "Olympic Games" – While the Paralympic Games are an important subsequent event, due to the specific language in the request, our analysis will solely focus on the Olympic Games. ▪ As requested, all costs shown will be in BY$2024 USD (unless noted otherwise). ▪ All point estimates shown will be at the 80th percentile of risk & uncertainty distribution (unless noted otherwise).
Key Assumptions	▪ Despite the Olympic award in 2017 (providing a 10-year planning horizon), LA is operating on the traditional 5-year planning and preparation timeline exercised by past host cities. ▪ The costs of relocation and acceleration are not independent; relocating two years into the five-year planning process would require accelerating certain tasks, even without the additional one-year shift. ▪ ATL27 will follow LA28's spirit of a no-build Olympics and use existing venues – avoiding new permanent construction wherever possible. ▪ Atlanta will be exempt from additional bidding costs to host the Olympics. ▪ All current contracts for hosting LA28 can be canceled without penalty under the "force majeure" clause.

The Olympics & Major Sporting Events are Well Documented and Studied

HOST CITY CONTRACT
OPERATIONAL REQUIREMENTS

DECEMBER 2016

FY2025 OPERATING & CAPITAL BUDGETS

marta

Summary of Sources and Uses of Funds

The Summary of Sources and Uses of Funds is an overview of MARTA's total funding sources and uses for FY2025 (see table on the following page). Details regarding funding sources and uses for Transit Operations and Capital Programs respectively are explained in this section.

LOS ANGELES

Georgia Tech stadium overhaul with huge screen, speakeasy in works

What You Need to Know About the Olympic Climbing Wall

Unveiling the Lead, Speed and Boulder walls, the Format, and how to read the Scoreboard

The Oxford Olympics Study 2016: Cost and Cost Overrun at the Games

APPENDIX A

LA28: 2024 Update to the City of Los Angeles

I. Management discussion and analysis

LA28 is well on track to deliver an amazing Olympic and Paralympic Games in Los Angeles in 2028. In 2023, LA28 focused on five strategic areas: (1) evolving the organizational strategy,

HOW MUCH DOES IT COST TO RENT A STADIUM?

STAGE 1
VISION, GAMES CONCEPT AND STRATEGY

CONSTRUCTION TECHNOLOGY | PROJECT MANAGEMENT

Construction Delays and Burnout: The High Cost of Compressed Schedules

PARIS 2024 PARIS 2024

SUSTAINABILITY & LEGACY POST-GAMES REPORT

LOS ANGELES ORGANIZING COMMITTEE FOR THE OLYMPIC AND PARALYMPIC GAMES
(A California Nonprofit Public Benefit Corporation)
Notes to Consolidated Financial Statements
December 31, 2022 and 2021

— Publié le 19 novembre 2024

PLUS D'UN MILLIARD D'EUROS POUR LA SÉCURITÉ

PARIS 2024

We Sourced Data Efficiently & Responsibly Using Modern Tools & Methods

AI Assisted Sourcing

- Large Language Models (e.g., ChatGPT, Gemini) were utilized for source identification
- AI capabilities were leveraged to discover relevant data

Cross Checks & Validation

- Secondary sources were cross checked with primary data and analogous sources
- All supplemental data were validated for relevancy

Normalization through APIs

- Demographic & economic data were derived from trusted sources (e.g., BLS, Census)
- Advanced geographical dispersion factors were derived from Google Maps API

Our List of 62 Data Sources Cover A Variety of Sources and Types

#	Name	Format	Source	Type	
1	Host-City-Contract-2028-Principles	PDF	**Primary**	Technical	
2	Host-City-Contract Appendix	PDF	**Primary**	Technical	
3	28 Projects by 2028 Games - LA Metro	Webpage	**Primary**	Cost	
4	LA Metro Board report on 28 Projects	PDF	**Primary**	Cost	
5	LA Metro Adopted Budgets (2017-2025)	PDF	**Primary**	Cost	
6	MARTA Adopted Budget 2025	PDF	**Primary**	Cost	
7	LA2024 Initial Proposal	PDF	**Primary**	Programmatic	
8	IOC-2028-Evaluation-Commission-Report	PDF	**Primary**	Programmatic	
9	IOC Annual Report - Official Olympic Documents	Webpage	**Primary**	Programmatic	
10	IOC-Marketing-Fact-File.pdf	PDF	**Primary**	Programmatic	
11	The-Olympic-Games-funding-model.pdf	PDF	**Primary**	Programmatic	
12	Tourist Numbers	xlsx	Secondary	Technical	**Validated ✓**
13	Luxury Resorts	Webpage	Secondary	Technical	**Validated ✓**
14	PBS - How LA is Preparing	Webpage	Secondary	Programmatic	**Validated ✓**
15	Bus Leasing	Webpage	Secondary	Technical	**Validated ✓**
16	The Oxford Olympics Study 2016 - Cost and Cost Overrun at the Games	PDF	**Primary**	Cost	
17	London Olympics Audit	Webpage	**Primary**	Cost	
18	NREL City Profiles	CSV	Secondary	Cost	**Validated ✓**
19	177 Hotel Statistics & Travel Trends in Los Angeles	Webpage	Secondary	Technical	**Validated ✓**
20	Overseas Tourism US States and Cities	xlsx	Secondary	Technical	**Validated ✓**
…	…	…	…	…	
60	Rock Climbing Wall Specs	Webpage	Secondary	Technical	**Validated ✓**
61	Cost and Revenue Overruns of the Olympic Games 2000–2018.pdf	PDF	Secondary	Cost	**Validated ✓**
62	GT Bobby Dodd Upgrade Budget	Webpage	Secondary	Cost	**Validated ✓**

Our Data Sources Can be Grouped into Four Major Categories

Official Documents

- Primary sources
- Define requirements
- Establish technical parameters
- Published by governing bodies (IOC, OCOG, host city councils)

Comprehensive Studies

- Primary and secondary sources
- Provide context
- Inform risk and uncertainty

Secondary Articles

- Detail cost drivers
- Supplement studies
- Public sentiment and external implications

Standardized Databases

- Normalize source data
- Establish factors
- Societal and economic trends (e.g., demographic and geographical data, inflation, global exchange rates)

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Estimate Structure

We Leveraged the Existing LA28 Estimate as a Starting Point for Analysis

LA28 Budget Breakdown

Item	Budgeted
Venue Infrastructure	$1.4B
Game Ops	$1.2B
Technology	$626M
People Management	$913M
Ceremonies	$245M
Marketing	$397M
Administrative	$587M
Other	$807M
Total Cost	$6.2B

Contingency	$616M
Total Budget	**$6.8B**

Data Source: LA28 2024 Update to the City of Los Angeles

$6.8B

LA28 Budget

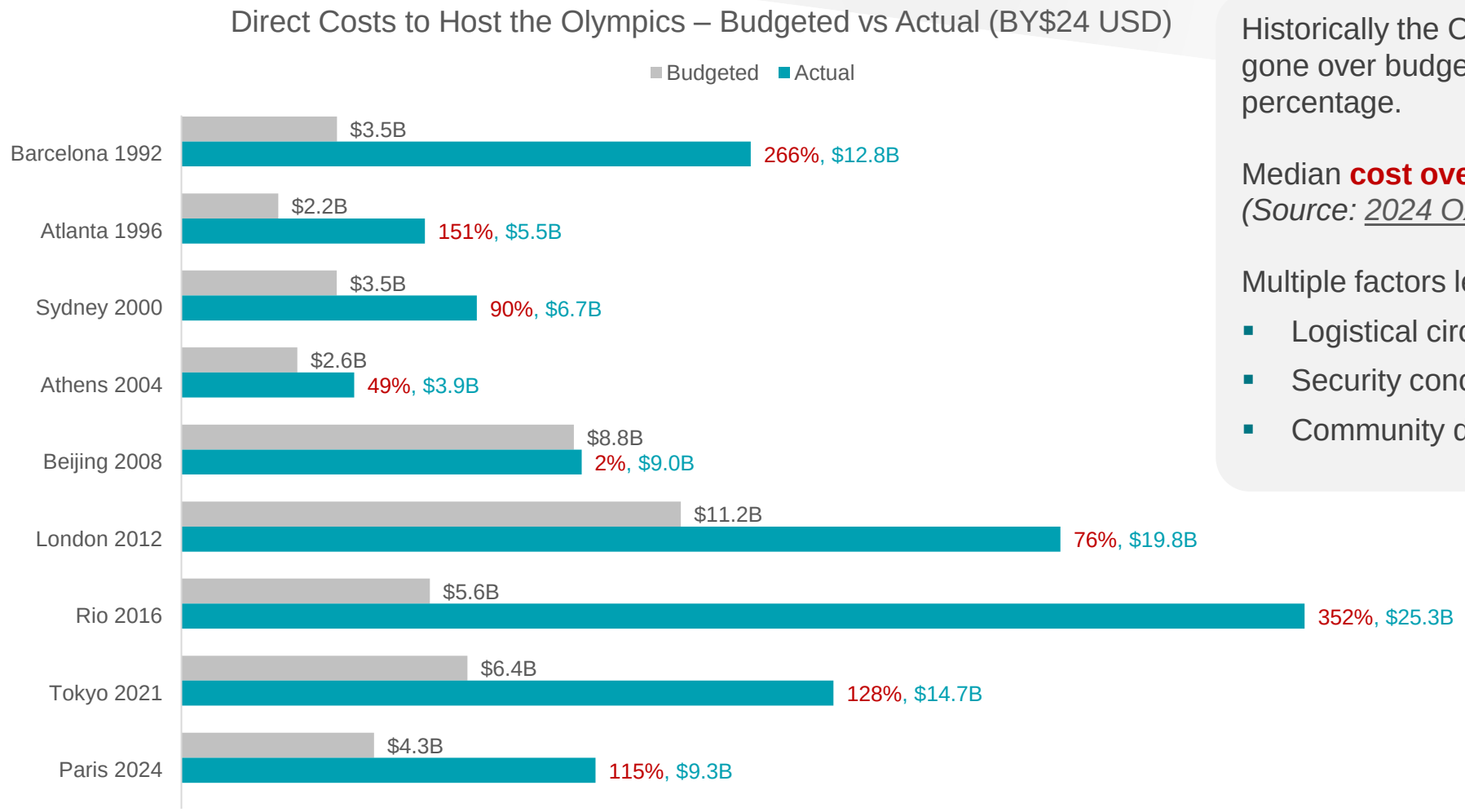
In a 2024 briefing to the city of Los Angeles, the LA28 OCOG presented their current cost breakdown and budget for hosting the 2028 Olympics.

$349M

LA28 Sunk Costs

Publicly available tax filings from the LA28 OCOG provided detailed sunk cost data, accounting for only **~6%** of the total budget.

History Shows That the LA28 Budget Warrants a Closer Look



Historically the Olympic Games have always gone over budget – often by a substantial percentage.

Median **cost overrun** for summer games: **121%** *(Source: 2024 Oxford Olympic Study).*

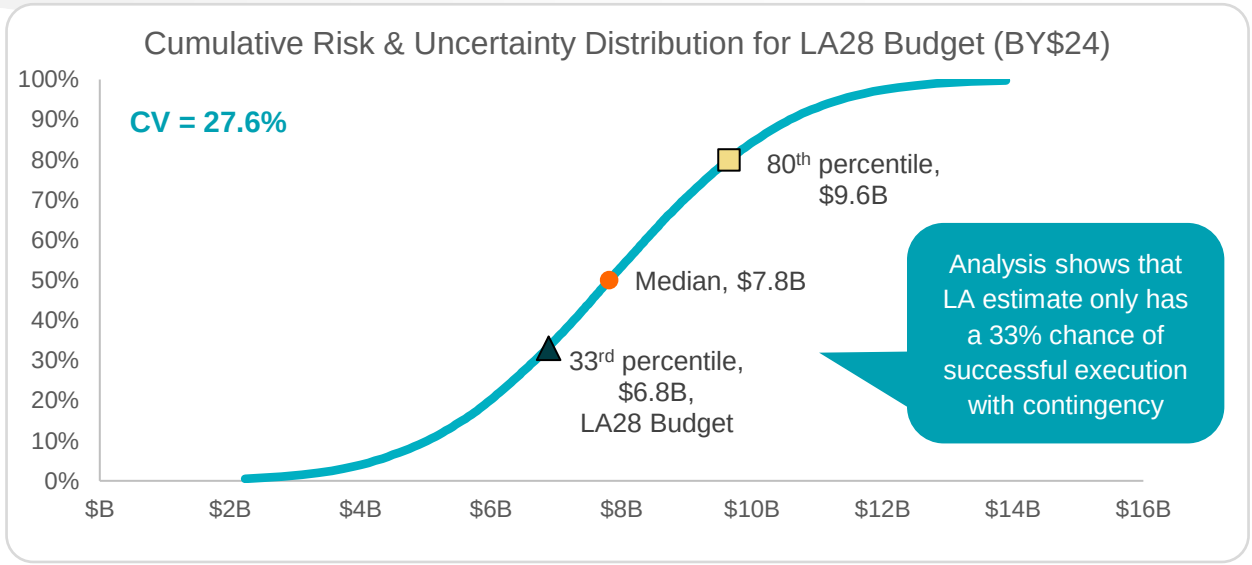
Multiple factors lead to large cost growth:

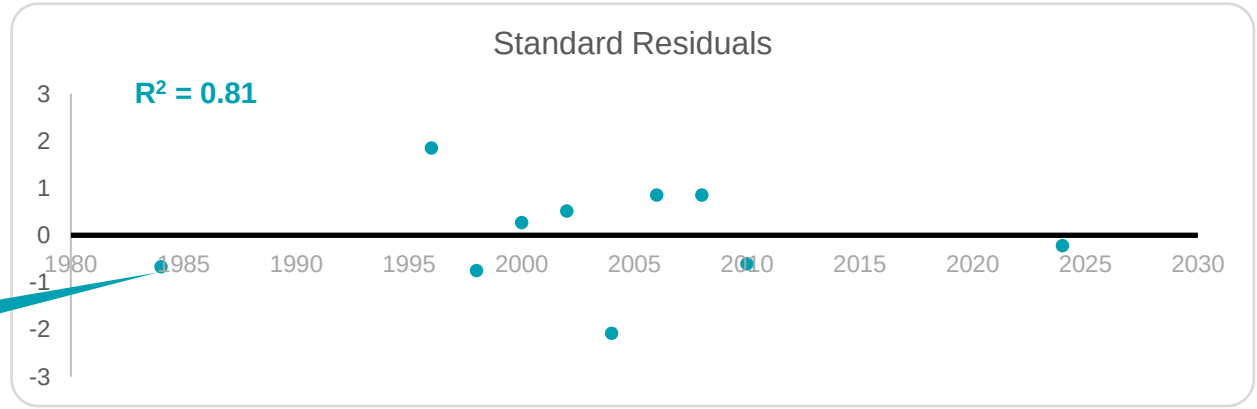
- Logistical circumstances
- Security concerns
- Community demands

Source for data shown in chart: Statista – The Huge Cost Behind the Olympic Games

We Performed an Independent Cost Review (ICR) on the LA28 Budget to Establish a More Realistic Baseline

- Utilizing parametric methods, we performed an Independent Cost Review (ICR) of the LA28 budget to establish a more realistic baseline.
- We considered a host of potential cost drivers that may hold explanatory power for the final cost of Olympic games.
- Our CER was calibrated to the last time LA hosted the Olympics in 1984 (a no-build Olympics that actually underran its budget).
- Using our regression statistics, we created a risk distribution using Monte Carlo simulation.





$$Olympics\ Cost\ (BY\$24M) = (32 * \#\ of\ Events) + (208 * \#\ of\ Venues) - (9666 * Summer\ Games?) - 2932$$

Our ICR Found the LA28 Point Estimate to be Overly Optimistic; So, We Adjusted it Based on Historical Data

LA28 Budget Breakdown

Item	Budgeted	Risk Adjusted
Venue Infrastructure	$1.4B	$2.1B
Game Ops	$1.2B	$1.8B
Technology	$626M	$896M
People Management	$913M	$1.3B
Ceremonies	$245M	$351M
Marketing	$397M	$569M
Administrative	$587M	$841M
Other	$807M	-
Total Cost	$6.2B	$7.8B
Contingency	$616M	$1.8B
Total Budget	**$6.8B**	**$9.6B**

Data Source: LA28 2024 Update to the City of Los Angeles

$6.8B

LA28 Budget

$9.6B

LA28 Risk Adjusted Budget

(Based on Our Analysis)

We Considered a Comprehensive List of Elements in our CES

#	Element	CEBoK Method(s)
0	**Sunk Costs**	Extrapolation
1	**Direct Operational Costs**	
1.1	Advanced Technologies	Parametric
1.2	Safety and Security	Analogy
1.3	Event Management	Analogy
1.4	Risk Management	Analogy
1.5	Shuttles & Buses	Parametric
1.6	*Contractual Penalties	
1.7	Rebranding	Analogy
1.8	IOC Approval and Compliance Studies	Parametric
1.9	Other Core Hosting Operations	Parametric
2	**Direct Capital Costs**	
2.1	Atlanta-Specific Costs	
2.1.1	New Temporary Structures	Build Up
2.1.2	Venue Refurbishment	Build Up
2.1.3	*New Permanent Structures	
2.2	Other Venue Infrastructure	Parametric
3	**Indirect Capital Costs**	
3.1	MARTA Expansion Acceleration	Extrapolation
3.2	*Hotels & Short-Term Rentals	
3.3	Safety and Security (Police/Military)	Parametric
4	**Implicit Costs**	
4.1	Out of Cycle Qualification Tournaments	Parametric
4.2	Surge Energy Costs from Tourism	Extrapolation
4.3	Opportunity Costs (Discounting)	Analogy
4.4	Loss of Ticketing and Hospitality Revenue	Analogy, Parametric

Differences in costs

Some Level 3 and Level 4 Cost Element Structure (CES) elements are omitted for brevity.

**Multiple elements were identified as having no discernible change between LA28 and ATL27 (e.g., sponsorship revenue) or were $0 based on GR&As (e.g., contractual penalties)*

#	Element	CEBoK Method(s)
5	**Benefits**	
5.1	Monetary Benefits	
5.1.1	*Increased Tourism	
5.1.3	*Sponsorship Revenue	
5.1.4	Improved & Added Infrastructure	Parametric
5.1.5	*Jobs	
5.2	Non-Monetary Benefits	
5.2.1	Reduced Carbon Emissions	Analogy, Parametric
5.2.2	Reduced Societal Disruption	Analogy

Differences in benefits

We Categorized the Costs (and Benefits) into Five Major CES Elements

Traditionally Included in Olympics Cost Estimates

Included in Our Analysis

1.0 Direct Operational Costs

IOC term: "OCOG Costs"

Operational costs incurred by the OCOG for the purpose of "staging" the Games.

Major components include:
- Advanced Technology
- Transportation
- Workforce
- Project Management
- Security
- Catering
- Ceremonies
- Medical services.

These may be considered the variable costs of staging the Games and are formally called "OCOG costs" by the IOC.

2.0 Direct Capital Costs

IOC term: "Non-OCOG Direct Costs"

Direct capital costs incurred by the host city or country or private investors to construct the competition venues, Olympic village(s), international broadcast center, and media and press center, which are required to host the Games.

These are the direct capital costs of hosting the Games and are formally called "non-OCOG direct costs."

3.0 Indirect Capital Costs

IOC term: "Non-OCOG Indirect Costs"

Indirect capital costs such as road, rail, or airport infrastructure, or hotel upgrades or other business investments incurred in preparation for the Games but not directly related to staging the Games.

These are wider capital costs and are formally called "non-OCOG indirect costs."

4.0 Implicit Costs

Implicit costs encompass hidden costs that are not directly accounted for in financial statements but are still associated with the Olympics.

These costs may include:
- Environmental impact costs
- Societal costs (e.g., disruption)
- Energy surge from tourism
- Opportunity costs
- Olympic Qualification Costs for NOCs

These costs are often harder to quantify and represent the hidden costs of the Olympics.

5.0 Benefits

Benefits refer to the positive financial and non-financial outcomes generated by the Olympics.

Benefits include:
- Monetary benefits (e.g., ticket sales, hospitality revenue, sponsorship deals, broadcasting rights)
- Tourism boost
- Infrastructure improvement
- Job creation
- Societal prestige and pride

These benefits may accrue directly through revenue or more indirectly via intangible means.

Source for definitions: The Oxford Olympics Study (2016)

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Techniques & Methods

We Leveraged a Variety of Methods & Techniques to Build Our Estimates

CEBoK Methods \ Techniques	Traditional	Geographic Dispersion	Economic/Labor Cost Factor	Acceleration Factor	EVM Projection	Pareto Principle
Analogy	Loss of Ticketing & Hospitality Revenue Benefits from Reduced City Disruption	Safety & Security (Games) Event Management Risk Management Shuttles/Buses		Shuttles/Buses Branding IOC Compliance Studies New Sports Venues		Out-Of-Cycle Qualification
Parametric	Benefits of Improved & Added Infrastructure	Advanced Technologies Safety & Security (Area)	Other Core Hosting Ops Other Venue Infrastructure Costs Surge Energy Costs from Tourism	IOC Compliance Studies		Out-Of-Cycle Qualification
Extrapolation	Sunk Costs Opportunity Costs				MARTA Expansion Acceleration	
Build-Up		Advanced Technologies	New Temporary Structures Arena Refurbishment	Venue Refurbishment		

Color Key : 1.0 Direct Operational Costs | 2.0 Direct Capital Costs | 3.0 Indirect Capital Costs | 4.0 Implicit Costs | 5.0 Benefits

We Will Showcase These Techniques Using Example CES Elements

CEBoK Methods \ *Techniques*	Traditional	Geographic Dispersion	Economic/Labor Cost Factor	Acceleration Factor	EVM Projection	Pareto Principle
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Technique A

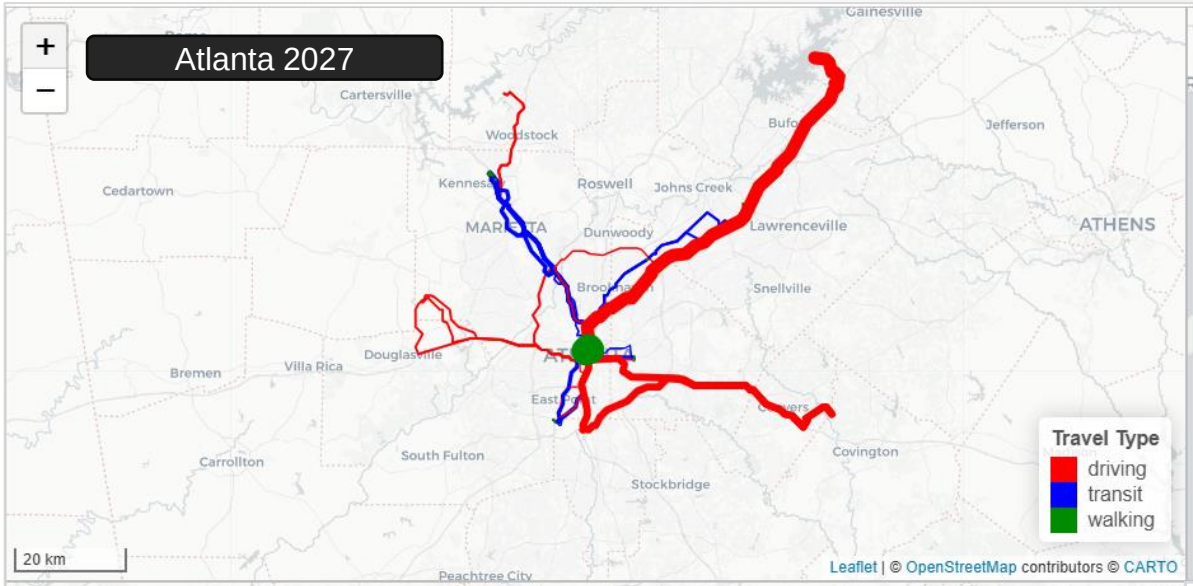
Geographic Dispersion

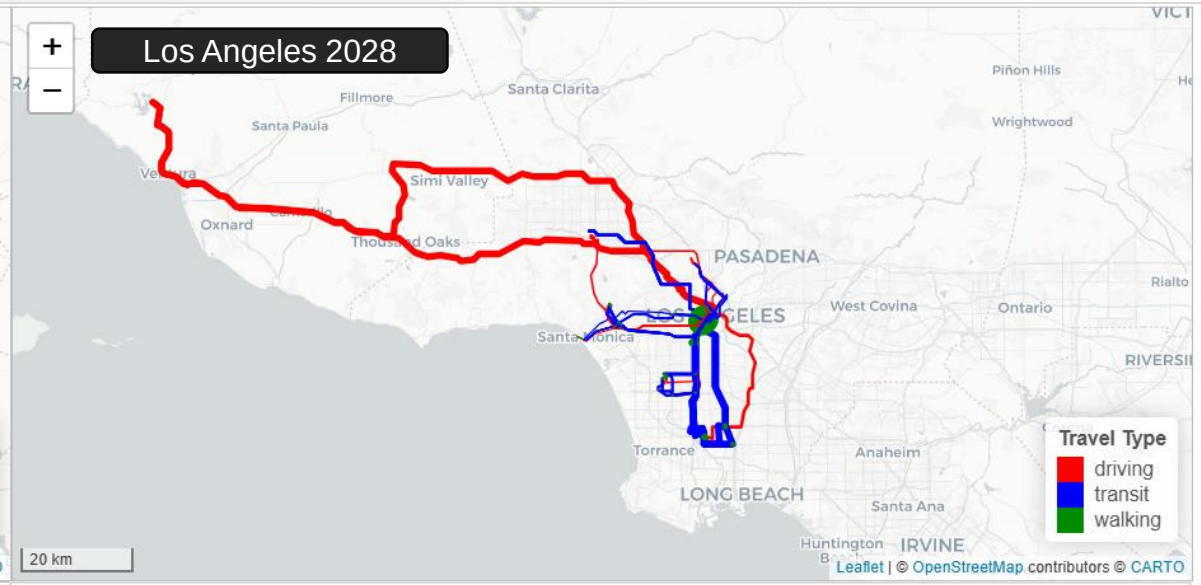
Application Example

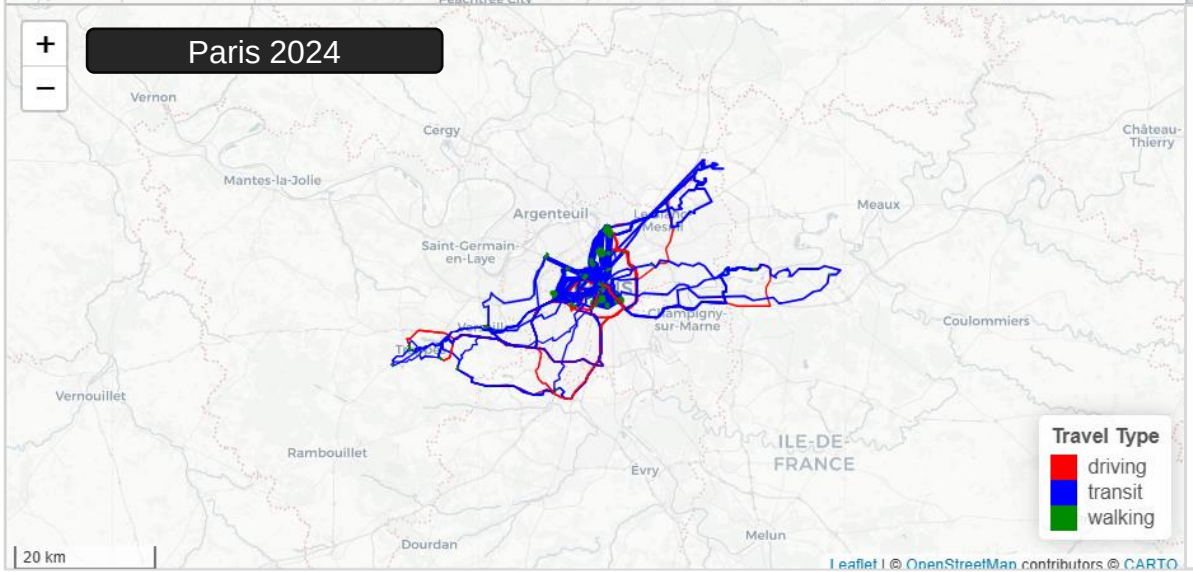
Safety and Security Costs

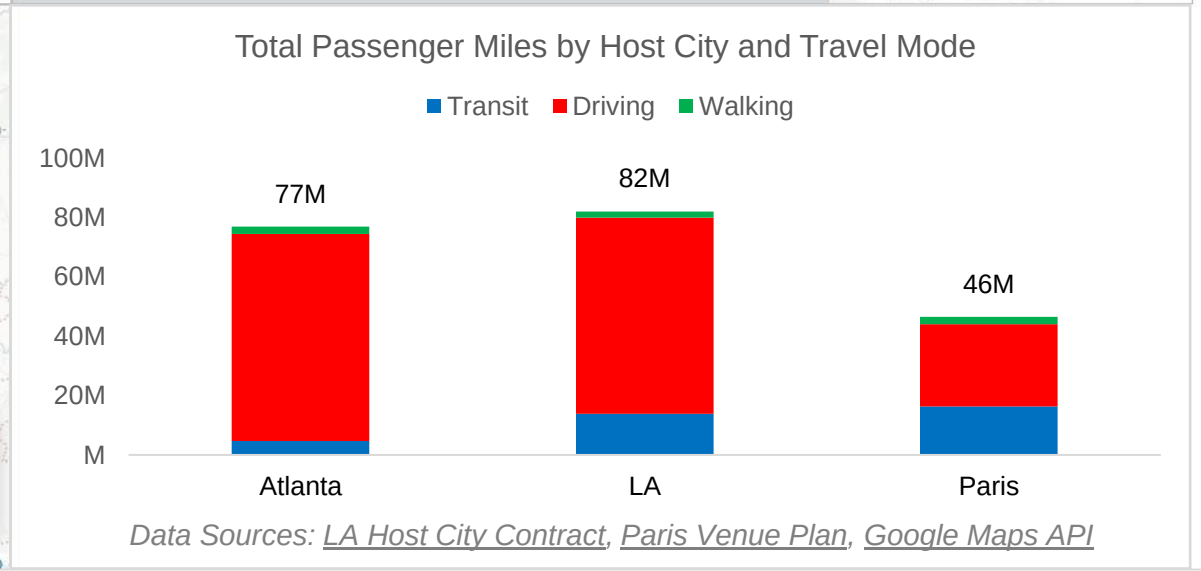
1.0 Direct Operational Costs

We Used The Google Maps API to Model How Visitors Would Disperse









Data Sources: LA Host City Contract, Paris Venue Plan, Google Maps API

We Created a Geographic Dispersion Factor to Estimate Cost Savings in Security

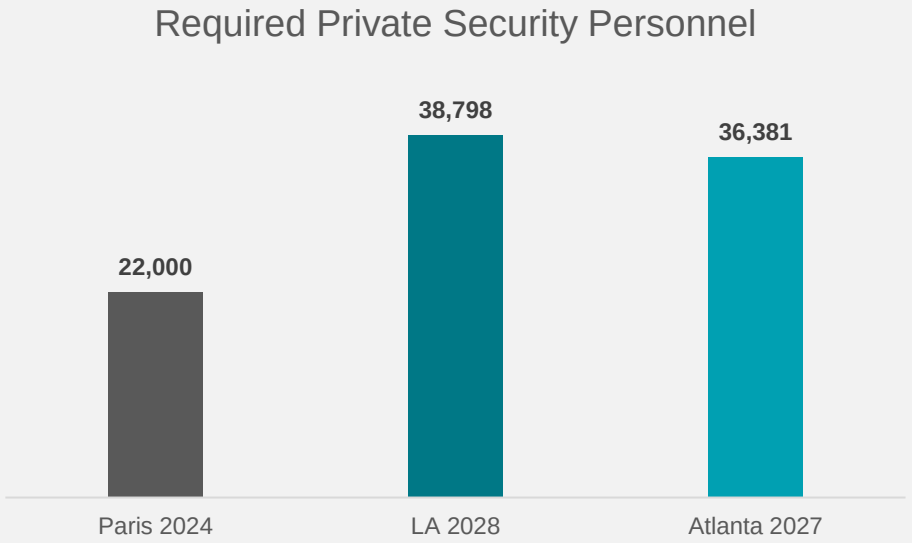
(1) Paris security personnel acts as a baseline: Paris hired 22,000 private security personnel to supplement the 40,000 provided police and military members. The cost to secure the 2024 Olympic games totaled over **$628M.**

(2) Calculate the dispersion factors: The venue plans for LA28 and ATL27 are considerably more spread out compared to Paris. More ground to cover means more security to hire.

Host City	Host City Passenger Miles	Paris Passenger Miles	Dispersion Factor (Relative to Paris)
Los Angeles 2028	82.0M	46.5M	1.76
Atlanta 2027	76.5M	46.5M	1.65

Data Sources: LA Host City Contract, Google Maps API, Paris Security Report

(3) Scale Cost Drivers: Apply dispersion factors to Paris analogy.



Atlanta requires 2,400 fewer personnel compared to LA.
At a rate of $30K per person, Atlanta can expect a savings of $73M dollars in security.

1.0

2.0

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4.1	Out of Cycle Qualification Tournaments	Parametric
4.2	Surge Energy Costs from Tourism	Extrapolation
4.3	Opportunity Costs (Discounting)	Analogy
4.4	Loss of Ticketing and Hospitality Revenue	Analogy, Parametric

Technique B

Acceleration Factor

Application Examples

Venue Refurbishment

Rebranding

1.0 Direct Operational Costs

2.0 Direct Capital Costs

We Quantified the Cost of Moving Faster by Using an Acceleration Factor

- A key component and driver of our cost estimate is **schedule acceleration.**

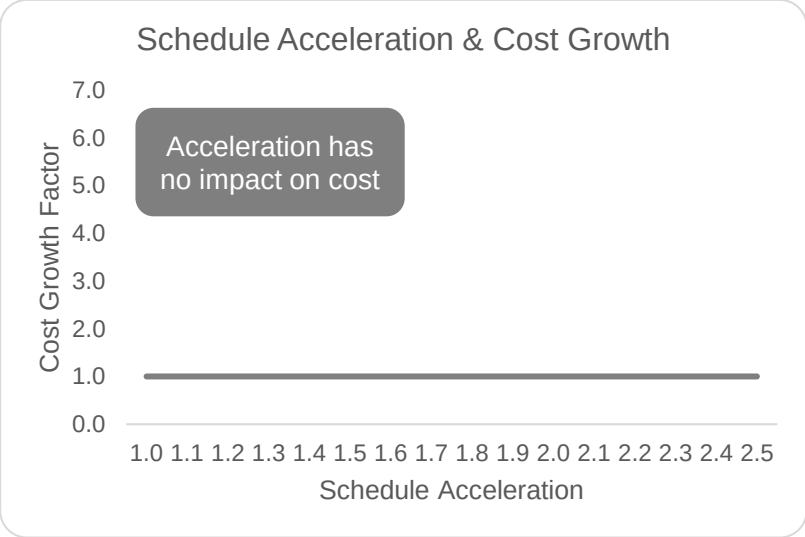
  How will shifting the Olympics to 2027 from 2028 impact our CES elements? Will all elements be affected? Will they be affected equally?

- We used the following equation to appropriately adjust costs based on schedule acceleration:

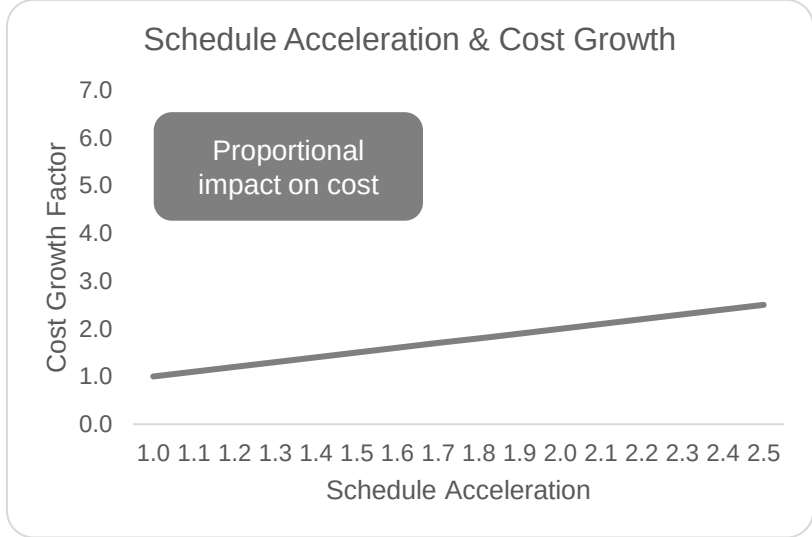
$$\textit{Cost Growth Factor} = (\textit{Original Duration}/\textit{New Duration})^{b}$$

- The ***b*** in the equation adjusts how aggressively costs increase as we accelerate the schedule (greater acceleration = greater cost growth).

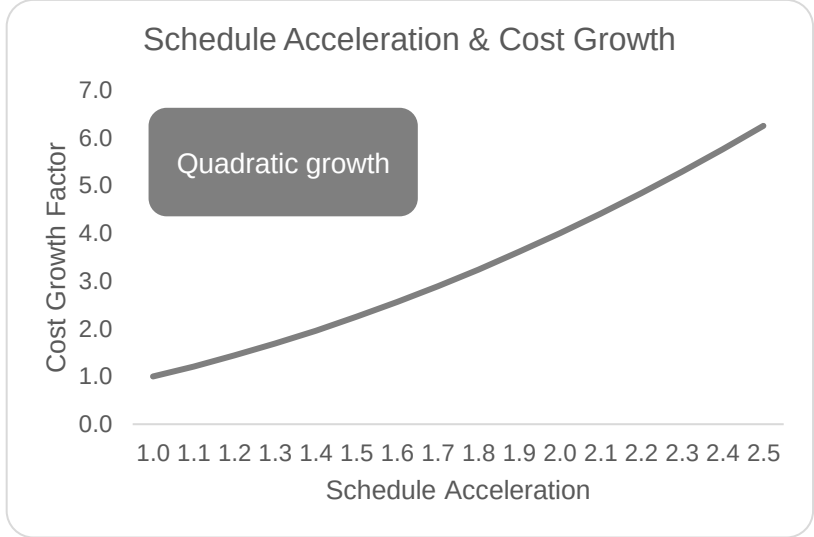
b = 0 (no effect)



b = 1 (proportional effect)



b = 2 (large effect)



We Quantified the Cost of Moving Faster by Using an Acceleration Factor

- A key component and driver of our cost estimate is **schedule acceleration.**

  How will shifting the Olympics to 2027 from 2028 impact our CES elements? Will all elements be affected? Will they be affected equally?

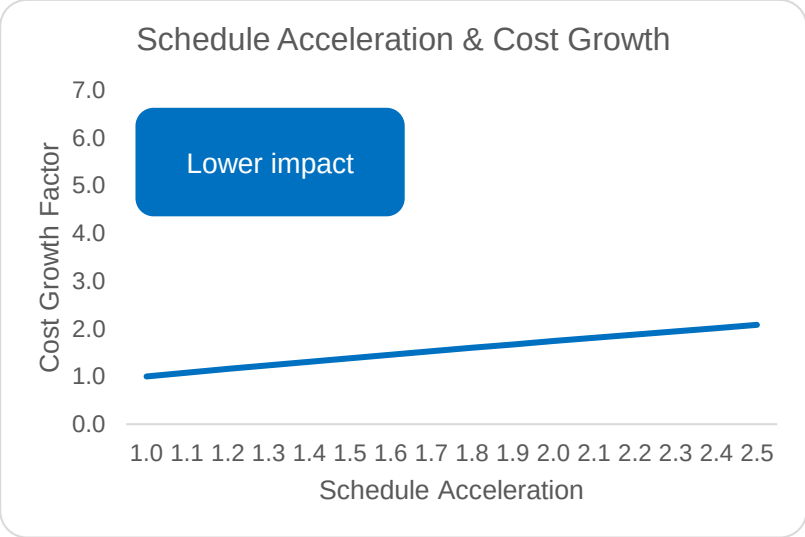
- We used the following equation to appropriately adjust costs based on schedule acceleration:

$$Cost\ Growth\ Factor = (Original\ Duration / New\ Duration)^{b}$$

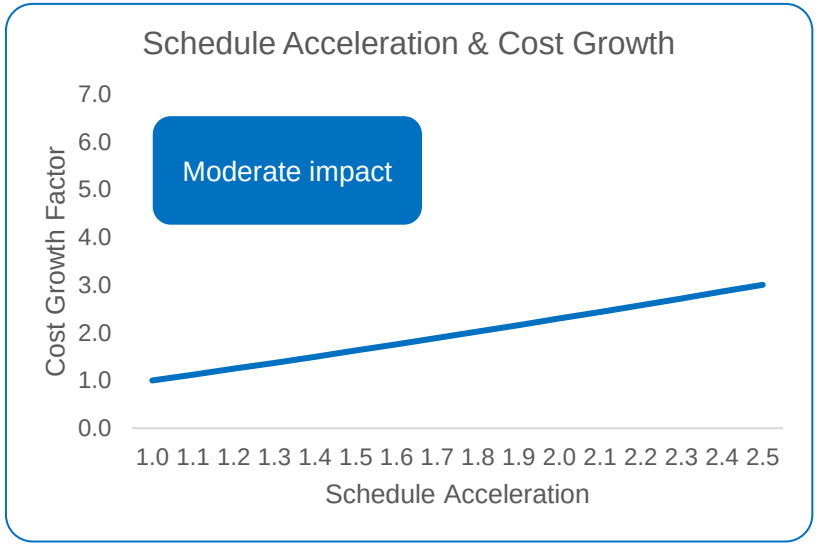
- The ***b*** in the equation adjusts how aggressively costs increase as we accelerate the schedule (greater acceleration = greater cost growth).

- Our **range for *b*** was determined through research and empirical data – COCOMO II (Software), AFCAA's Joint Cost Schedule Model (Defense), and Association for the Advancement of Cost Engineering (Construction).

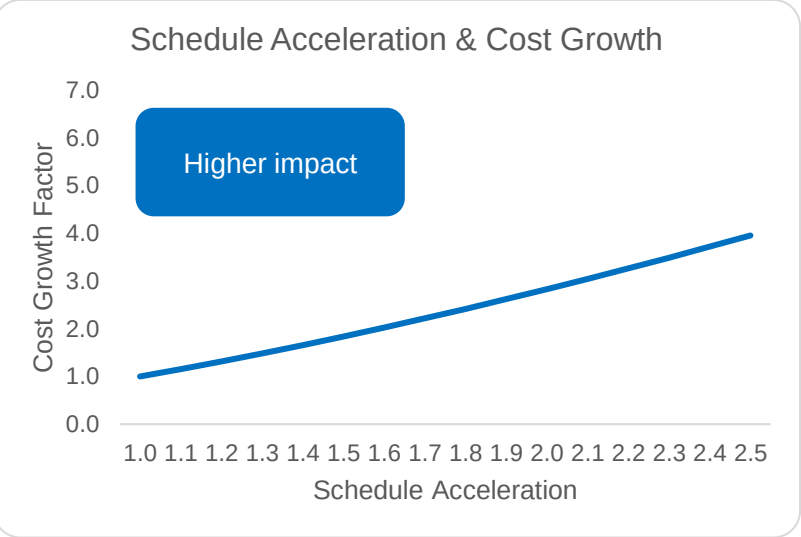
b = 0.8 (low)



b = 1.2 (most likely)



b = 1.5 (high)



We Used AI to Identify 1:1 Venue Parallels Between LA28 and ATL27

#	Event	LA28 Location	ATL27 Equivalent Location	Meet Requirements?
1	Olympic Village	UCLA	Georgia Tech	Yes
2	Opening/Closing Ceremonies	SoFi Stadium	Mercedes-Benz Stadium	Yes
3	Gymnastics	Crypto.com Arena	State Farm Arena	Yes
4	Athletics (Track & Field)	LA Memorial Coliseum	GT Bobby Dodd Stadium	No
5	Baseball	Dodger Stadium	Truist Park	Yes
…	…	…	…	…
41	Diving	LA Swim Stadium (1932 Pool)	GT Aquatic Center	Yes

Meeting Olympic Standards by 2027 Requires an Accelerated Refurbishment Plan

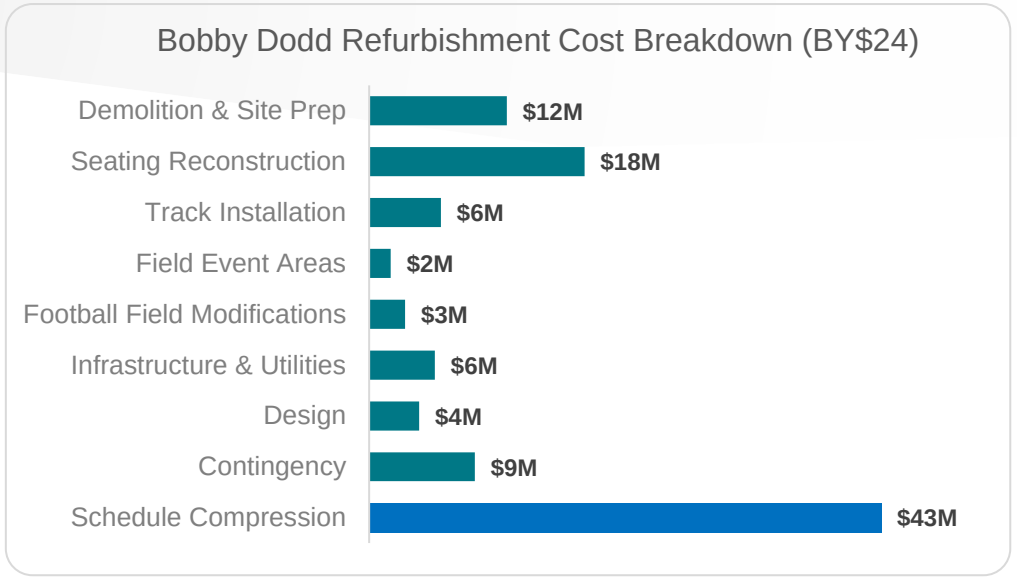
Goal: Refurbish GT's Bobby Dodd Stadium <u>in time</u> for ATL27

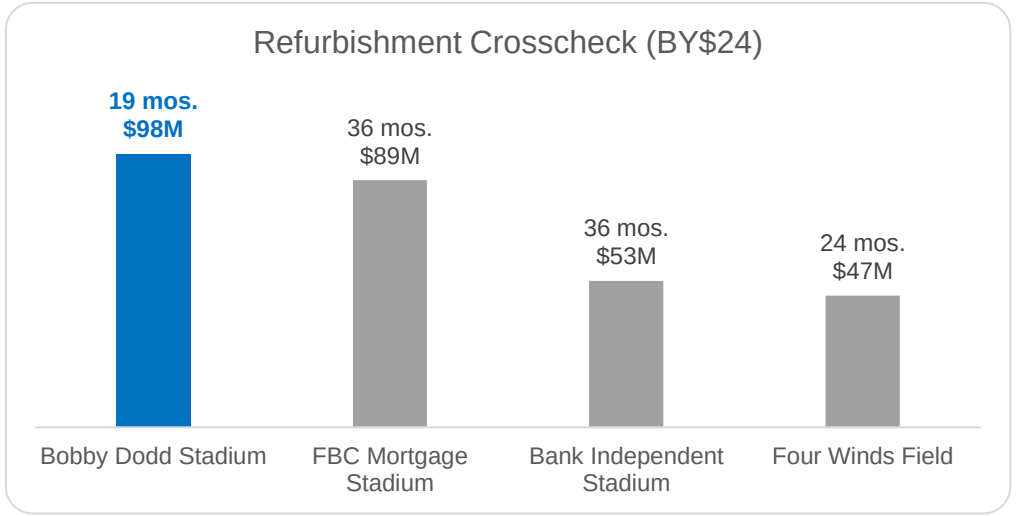
- Completed an Analysis of Alternatives (AoA) to assess feasibility of Griffin Track Upgrade vs. Bobby Dodd Refurb
  - Griffin Track Upgrade would not support the # of spectators required for ATL27 Olympics
- Built up cost elements
- Schedule compression is 42% of total refurbishment cost

$$Cost\ Growth\ Factor = (24\ mos./19\ mos.)^{1.2}$$

  - Project estimated to take **24** months
  - Accelerated to **19** months for ATL27
- Cost = **$98M**

Data Sources: <u>Bobby Dodd Upgrade Budget</u>, <u>Sports Venue Cost Calculator</u>, <u>Irwin Seating Company</u>, <u>Estimate Florida Consulting</u>, <u>Commonwealth Stadium Budget</u>, <u>Client CERs</u>





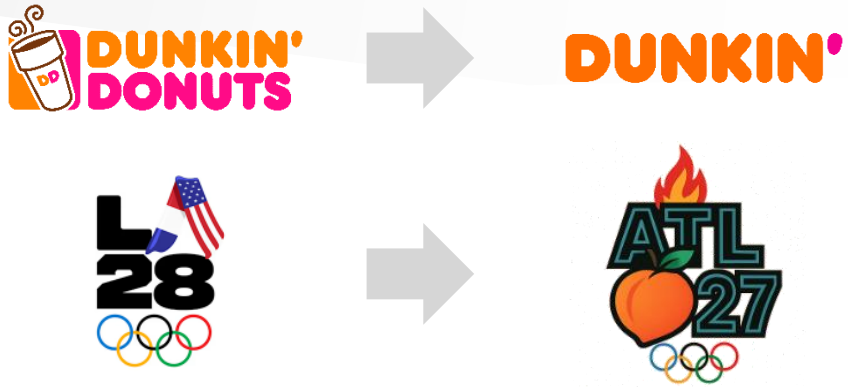
Relocating Requires Rebranding from LA28 to ATL27 – and Fast!

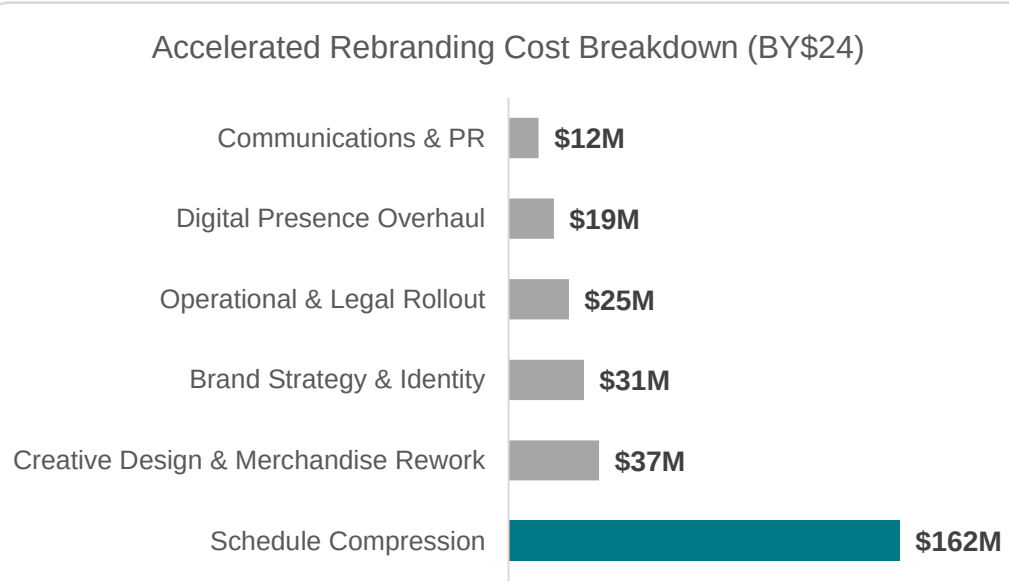
- **Method:** Dunkin' Donuts Global Rebrand (Analogy)
- **Justification:** Comparable geographic footprint (spanning 46+ countries), brand visibility, and operational scale to the Olympics
- **Cross Check:**
  - Dunkin rebrand = $125M = ATL27 base rebrand
  - ATL27 base rebrand = ~20% of LA28's risk-adjusted marketing budget
  - Industry rebranding benchmarks: 10–20% of marketing budget
- Schedule Compression is **56%** of total Rebranding Cost

$$Cost\ Growth\ Factor = (18\ mos./9\ mos.)^{1.2}$$

  - Dunkin' Rebrand: **18** months.
  - ATL27: **9** months – allows time for venue signage, merchandise production, global sponsorships and IOC approvals.
- **Cost =** ATL27 Base Rebrand * CGF = **$311M**

Data Sources: Dunkin Donuts Newsroom, Smashbrand, Wall Street Journal – "Dunkin' Invests $100M in Brand Refresh", HiveMind Studios – "Rebranding Cost & Strategy"





#	Element	CEBoK Method(s)
0	**Sunk Costs**	Extrapolation
1	**Direct Operational Costs**	
1.1	Advanced Technologies	Parametric
1.2	Safety and Security	Analogy
1.3	Event Management	Analogy
1.4	Risk Management	Analogy
1.5	Shuttles & Buses	Parametric
1.6	*Contractual Penalties	
1.7	Rebranding	Analogy
1.8	IOC Approval and Compliance Studies	Parametric
1.9	Other Core Hosting Operations	Parametric
2	**Direct Capital Costs**	
2.1	Atlanta-Specific Costs	
2.1.1	New Temporary Structures	Build Up
2.1.2	Venue Refurbishment	Build Up
2.1.3	*New Permanent Structures	
2.2	Other Venue Infrastructure	Parametric
3	**Indirect Capital Costs**	
3.1	MARTA Expansion Acceleration	Extrapolation
3.2	*Hotels & Short-Term Rentals	
3.3	Safety and Security (Police/Military)	Parametric
4	**Implicit Costs**	
4.1	Out of Cycle Qualification Tournaments	Parametric
4.2	Surge Energy Costs from Tourism	Extrapolation
4.3	Opportunity Costs (Discounting)	Analogy
4.4	Loss of Ticketing and Hospitality Revenue	Analogy, Parametric

Technique C

Earned Value Management (EVM) Projection

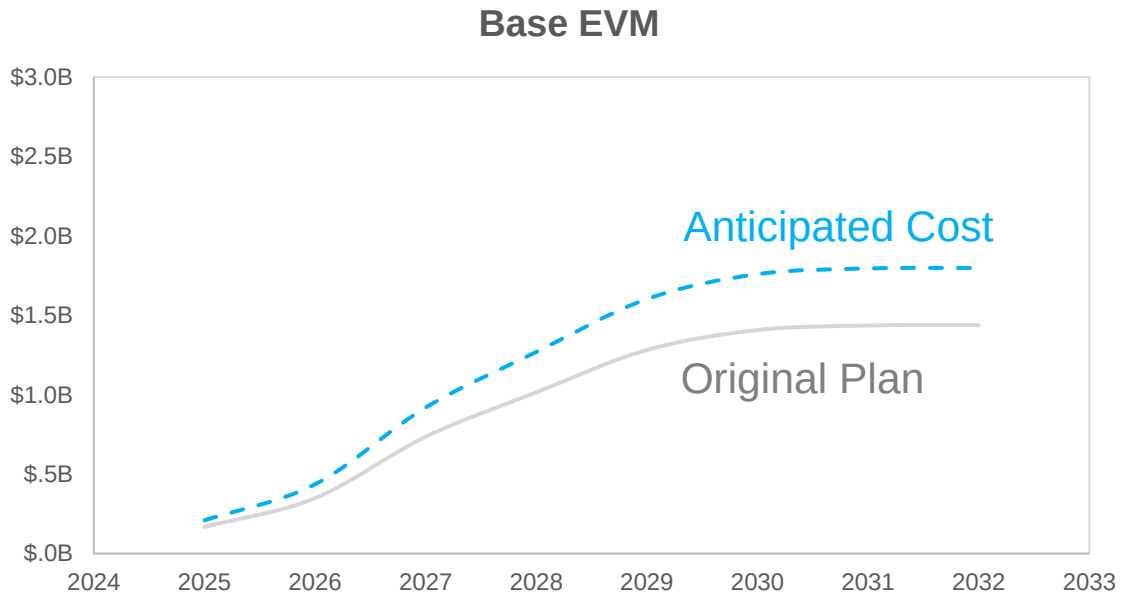
Application Example

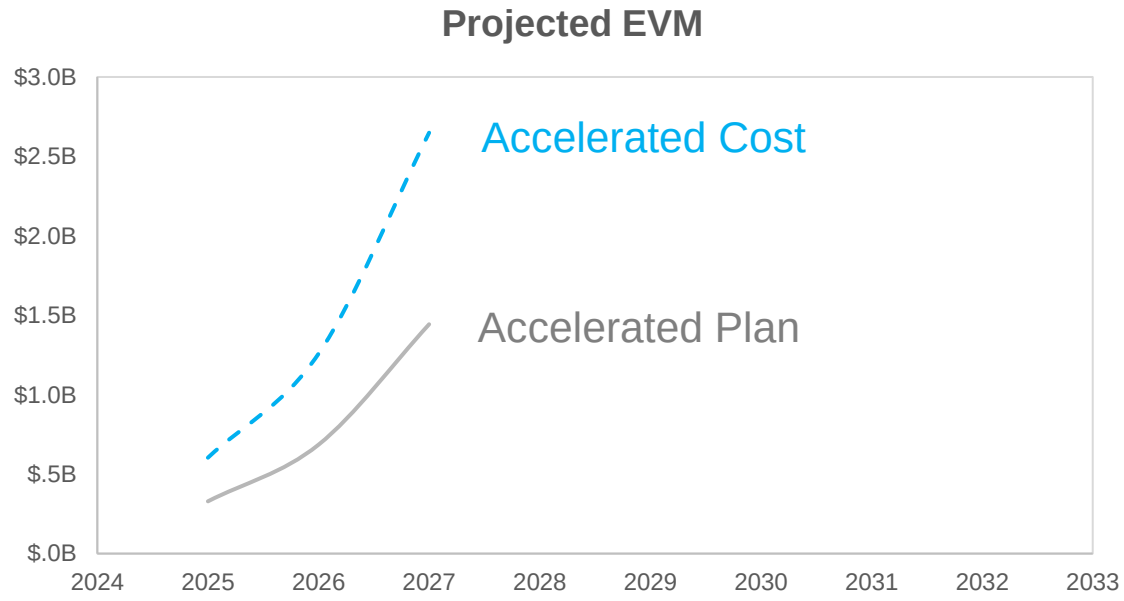
Acceleration of the MARTA Expansion Project

3.0 Indirect Capital Costs

EVM Offers a Framework to Adjust The Cost of Existing Plans

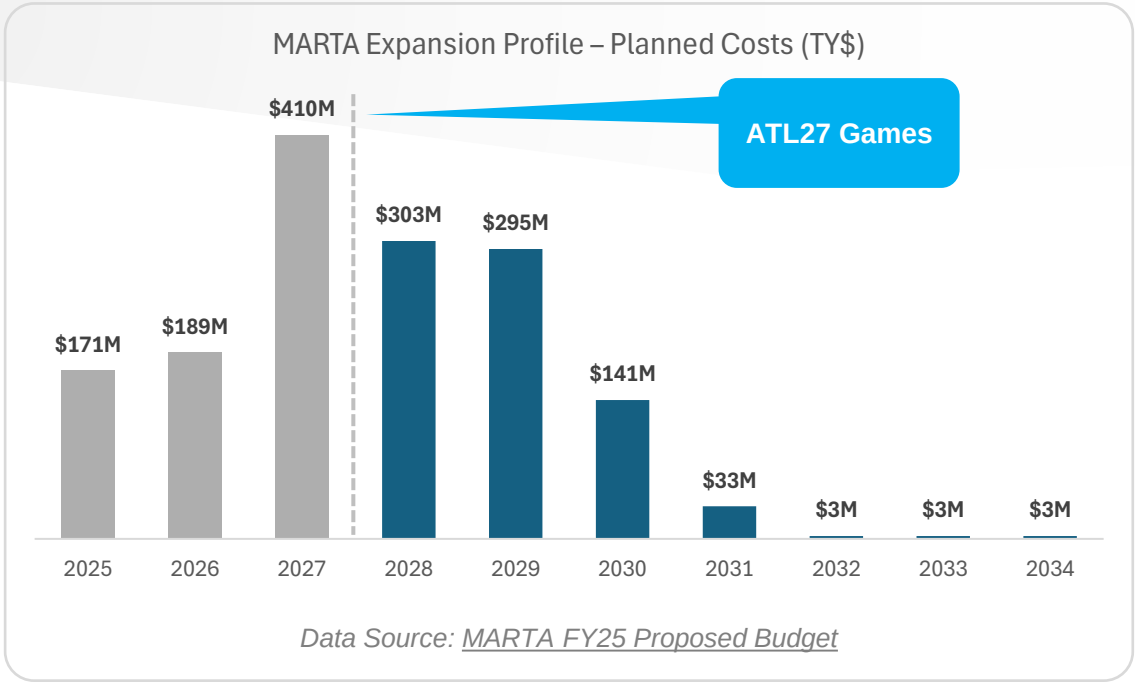
- Where possible, existing city plans should be leveraged and adjusted for key factors, such as timeline differences and reasonableness of the estimate.
- By assuming a project will execute according to existing plans, it becomes possible to estimate the cost impact of accelerating the remaining work into the time available using performance indices (*Source: CEBoK module 15*).

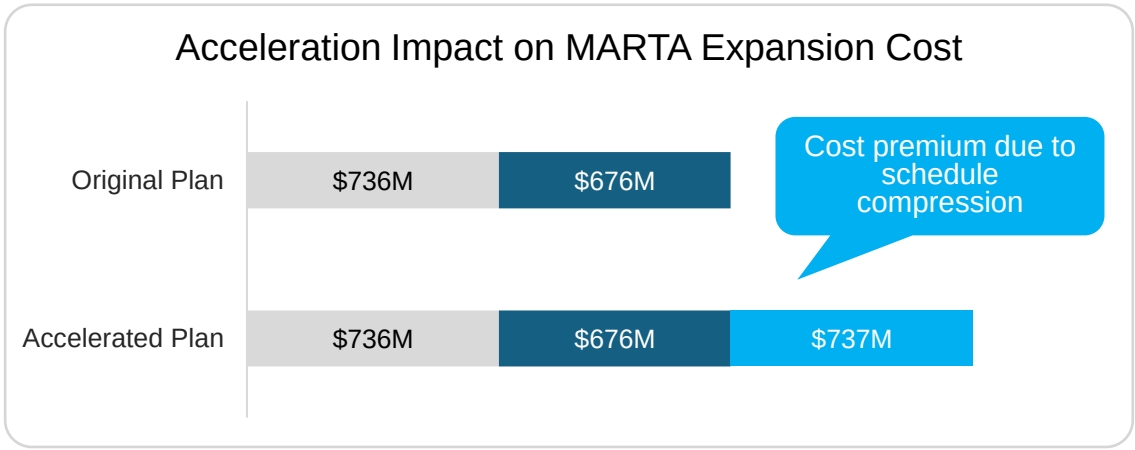




Beyond Direct Costs to Host, Transportation Infrastructure Must Also be Reliable for a Successful Olympics

- Goal: Accelerate the expansion of Atlanta public transportation expansion in time for ATL27.
- Metropolitan Atlanta Rapid Transit Authority (MARTA) already has plans up to 2034 for upgrading public transit infrastructure.
- Assuming MARTA executes according to their original plan, an earned value of $676M would be achieved as opposed to the $1.4B required to complete existing plans by 2027.
- This results in an SPI of 0.51 and cost increase of **$737M** due to acceleration.





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4.4	Loss of Ticketing and Hospitality Revenue	Analogy, Parametric

Technique D

Pareto Principle

Application Example

Out-of-Cycle Qualification Tournaments

4.0 Implicit Costs

Acceleration to 2027 will Require an Additional Out-of-Cycle Qualification Tournament for All Individual Sports Across All Participating Nations

15 Sports are Qualified by National Teams

- Baseball/Softball
- Basketball 3X3
- Basketball 5X5
- Beach Volleyball
- Cricket
- Flag Football
- Football (Soccer)
- Handball
- Hockey
- Lacrosse
- Rowing
- Rugby
- Sailing
- Volleyball
- Water Polo

Athletes of a nation compete *together* against other nations to qualify their nation.

Acceleration to 2027 *does not* require additional out-of-cycle tournament for each nation to determine who to send to the Olympics.

36 Sports are Qualified by Individuals

- Archery
- Artistic Swimming
- Athletics (Track & Field)
- Badminton
- Boxing
- Canoe – Slalom
- Canoe – Sprint
- Cycling - BMX Freestyle
- Cycling - BMX Racing
- Cycling - Mountain Bike
- Cycling – Road
- Cycling – Track
- Diving
- Equestrian – Dressage
- Equestrian – Eventing
- Equestrian – Jumping
- Fencing
- Golf
- Gymnastics
- Judo
- Marathon Swimming
- Modern Pentathlon
- Rowing Coastal Beach Sprints
- Shooting
- Skateboarding
- Sport Climbing
- Squash
- Surfing
- Swimming
- Table Tennis
- Taekwondo
- Tennis
- Triathlon
- Weightlifting
- Wrestling - Greco-Roman
- Wrestling Freestyle

Athletes of a nation compete *against each other* to *represent* their nation.

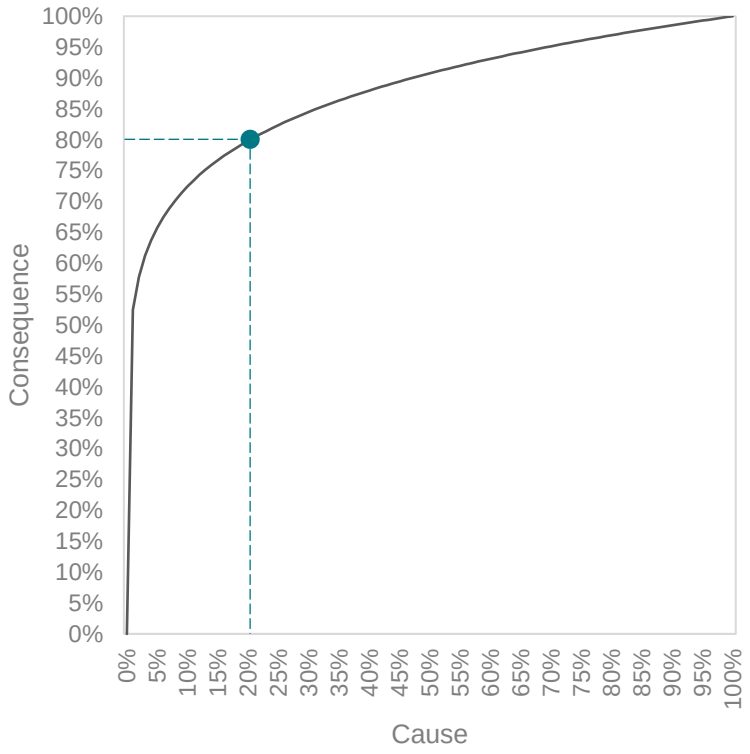
Requires an additional out-of-cycle tournament for each nation to determine who to send to the Olympics.

Data source for list of sports: IOC – Official Programme of the LA28 Olympics
Data source for qualification procedure: IOC – How do Athletes Qualify?

The Pareto Principle Enabled Us to Estimate the Qualification Costs for All 36 Individual Sports by Analyzing a Few Key Ones

Pareto Principle (80/20 Rule)

80% of consequences come from 20% of the causes



Source: Journal of the American Society for Information Science

Wealth

80% of land in Italy is owned by 20% of the population.
80% of wealth is owned by 20% of citizens.

Healthcare

80% of healthcare costs are generated by 20% of patients.

Software

80% of software errors are caused by 20% of the bugs.

Business

80% of revenue comes from 20% of the customers.
80% of costs come from 20% of products.

Assumption:

80% of the costs to host the additional out-of-cycle qualification tournaments will come from 20% of the sports.

Leveraging the Pareto Principle, We Estimated the Costs of Out-of-Cycle Qualification Tournaments for All Individual Sports and All Nations

(1) Identified "Top Sports": Defined by athlete quotas for each sport.

(2) Estimated Costs for Top Sports in the USA: Calculated the cost of hosting additional qualification tournaments in the USA for key sports.

Track & Field

Data source for cost: The Register Guard

Swimming

Data source for cost: The Pricer Org

(3) Derived Costs for Other Sports: Used the **Pareto principle** to estimate the total cost for the USA to host additional qualification tournaments across all sports.

(4) Derived Costs for Other Nations: Normalized the USA cost estimate based on the number of athletes each country sent to Paris 2024 and the global exchange rates:

Country	# Athletes	Cost (BY$24 USD)
USA	594	$7.06M
France	572	$6.80M
Australia	460	$5.47M
…	…	…
Cook Islands	2	$23K
Nauru	1	$12K

Data source for number of athletes: Paris 2024 Olympics Report
Data source for exchange rates: World Bank Official Exchange Rates

Total cost for USA = **$7M**

Total cost for all nations = **$112M**

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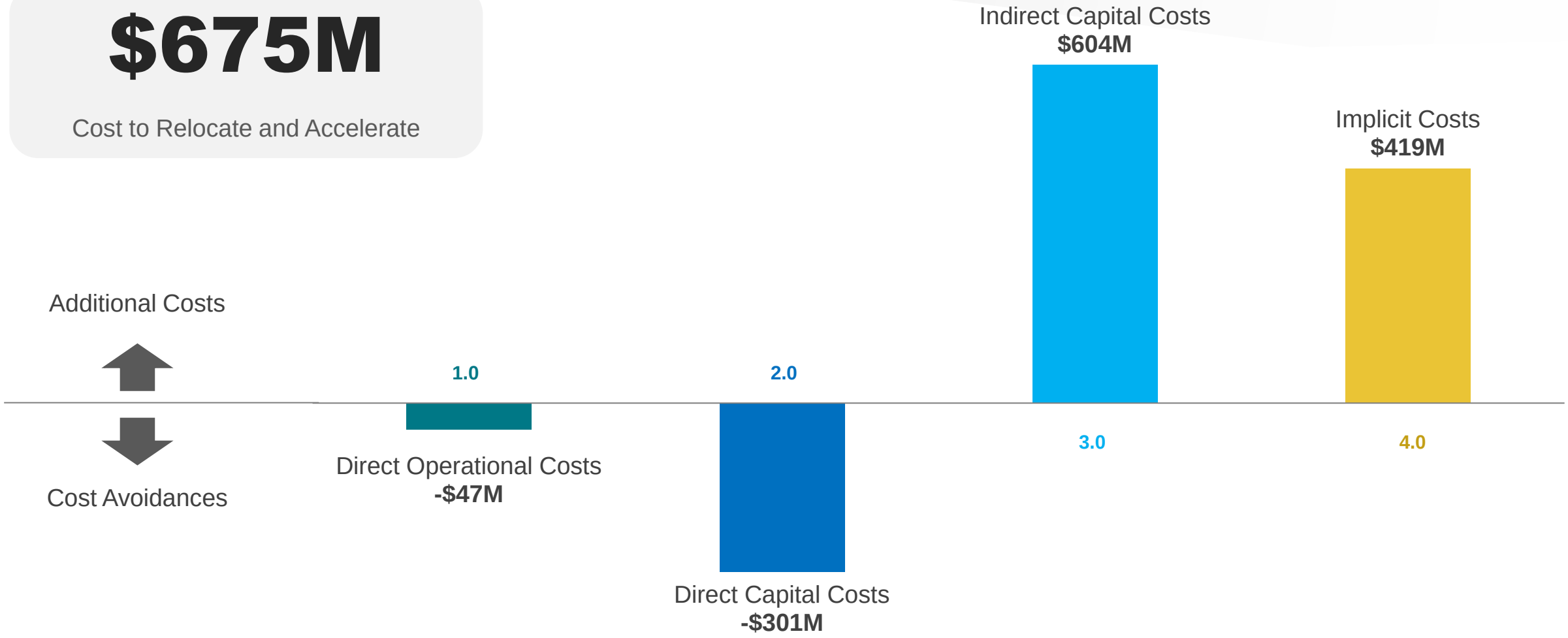
Analysis of Results

Our Estimate Includes *Both* Positive and Negative Elements

$675M

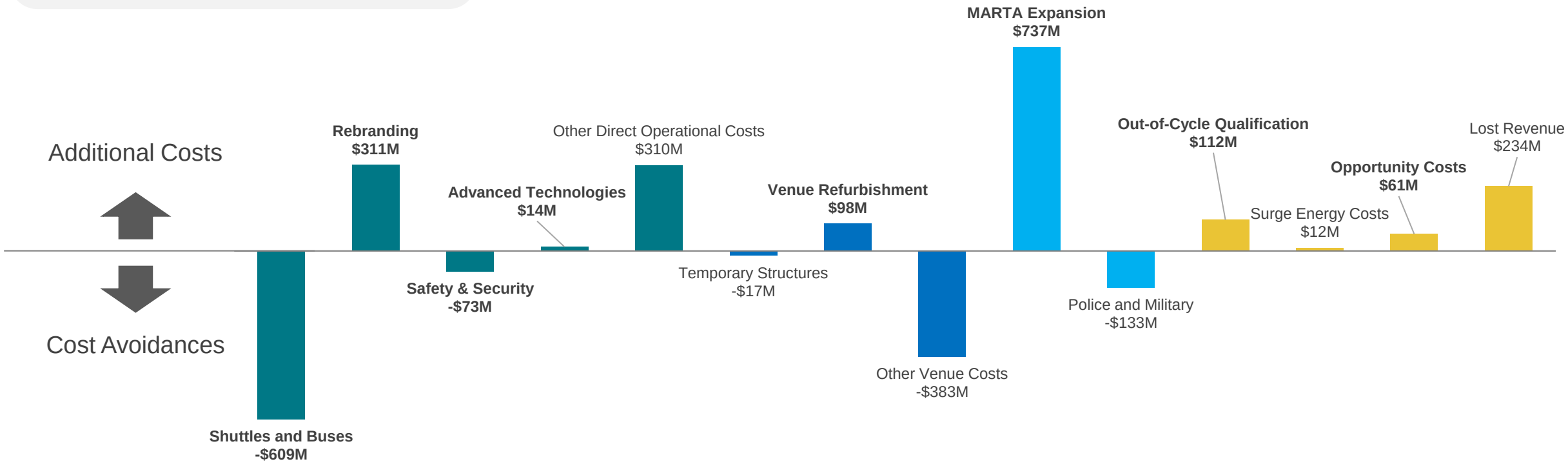
Cost to Relocate and Accelerate



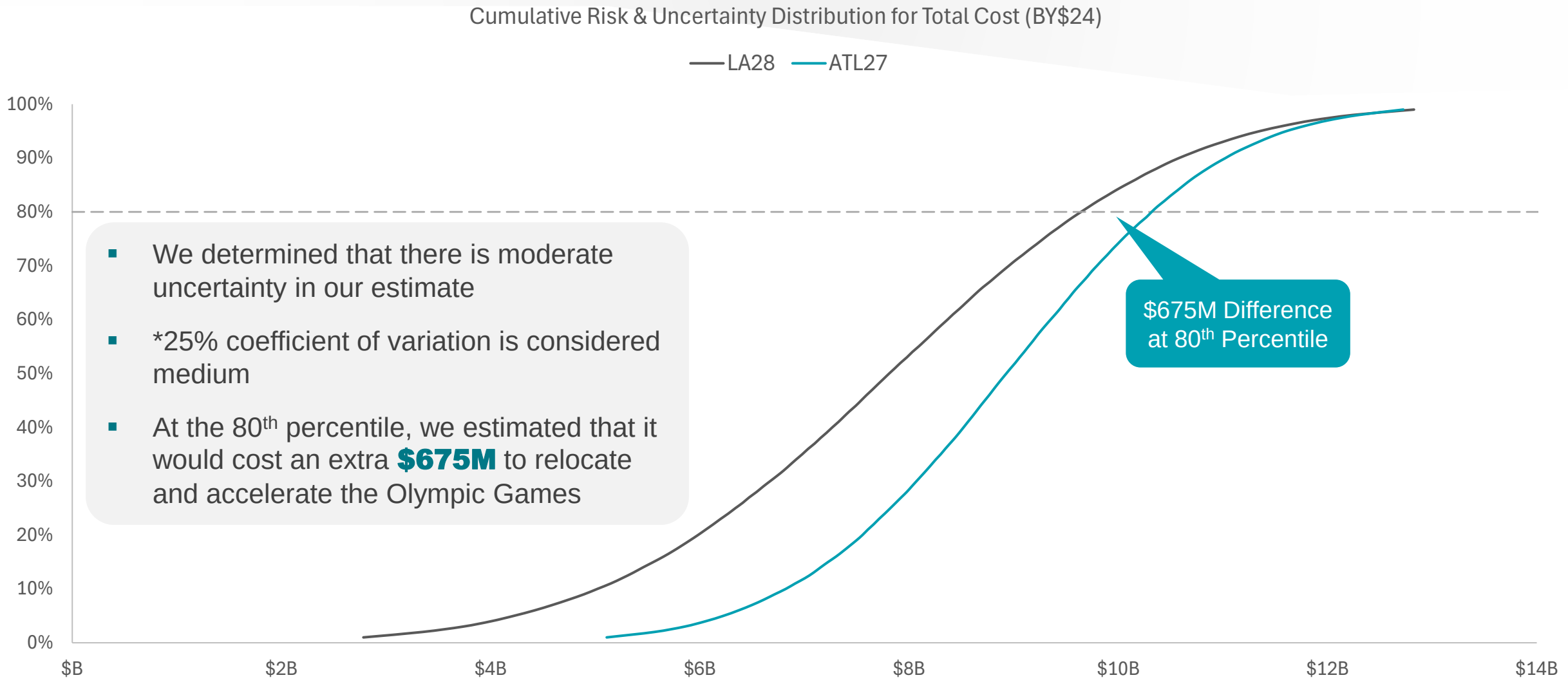
Many Additional Costs are Offset by Cost Avoidances

$675M

Cost to Relocate and Accelerate



We Performed a Risk & Uncertainty Analysis of Our Estimate



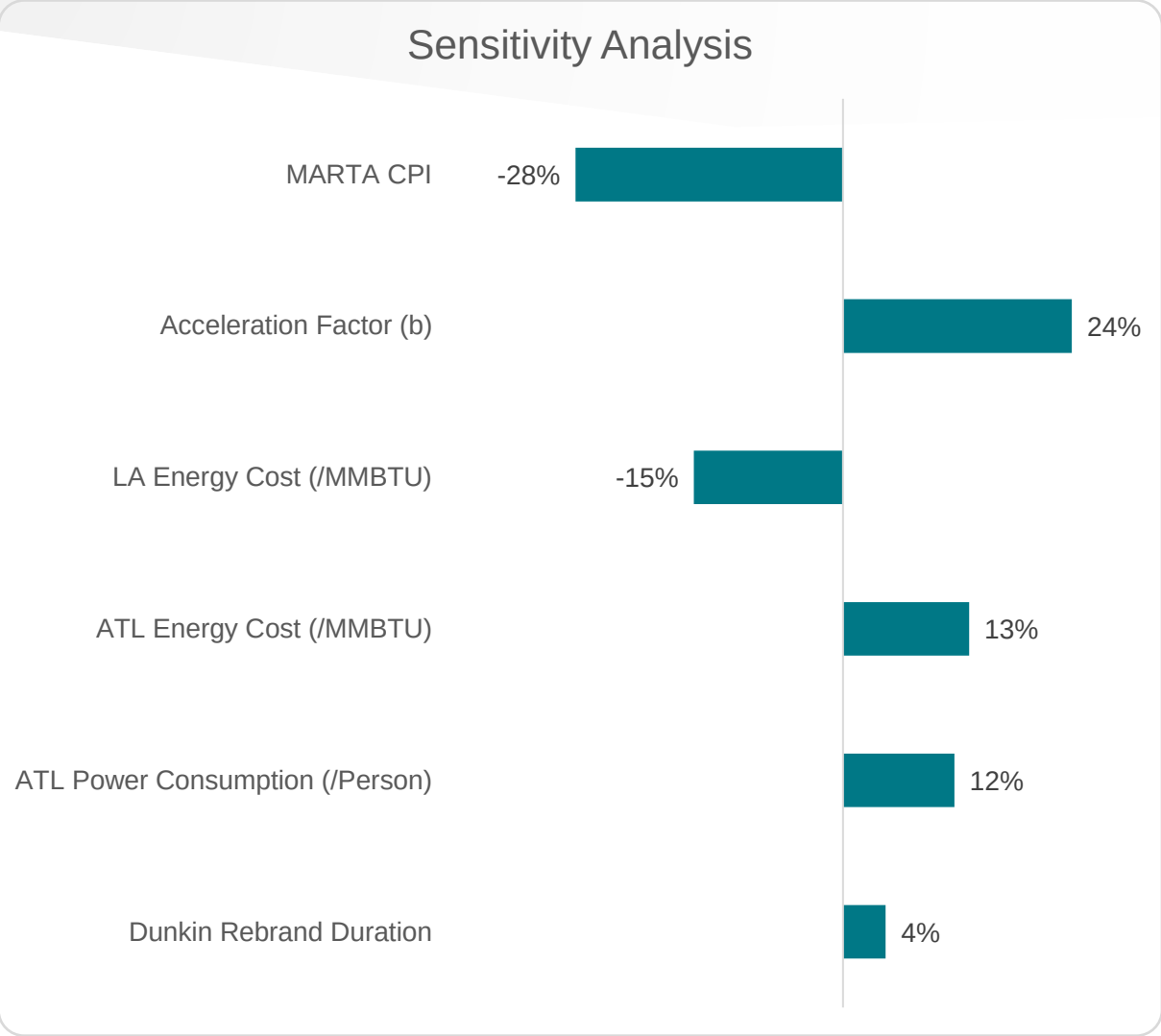
- We determined that there is moderate uncertainty in our estimate
- *25% coefficient of variation is considered medium
- At the 80th percentile, we estimated that it would cost an extra **$675M** to relocate and accelerate the Olympic Games

*Source for 25% CV Rule of Thumb: Joint Cost Schedule Risk and Uncertainty Handbook

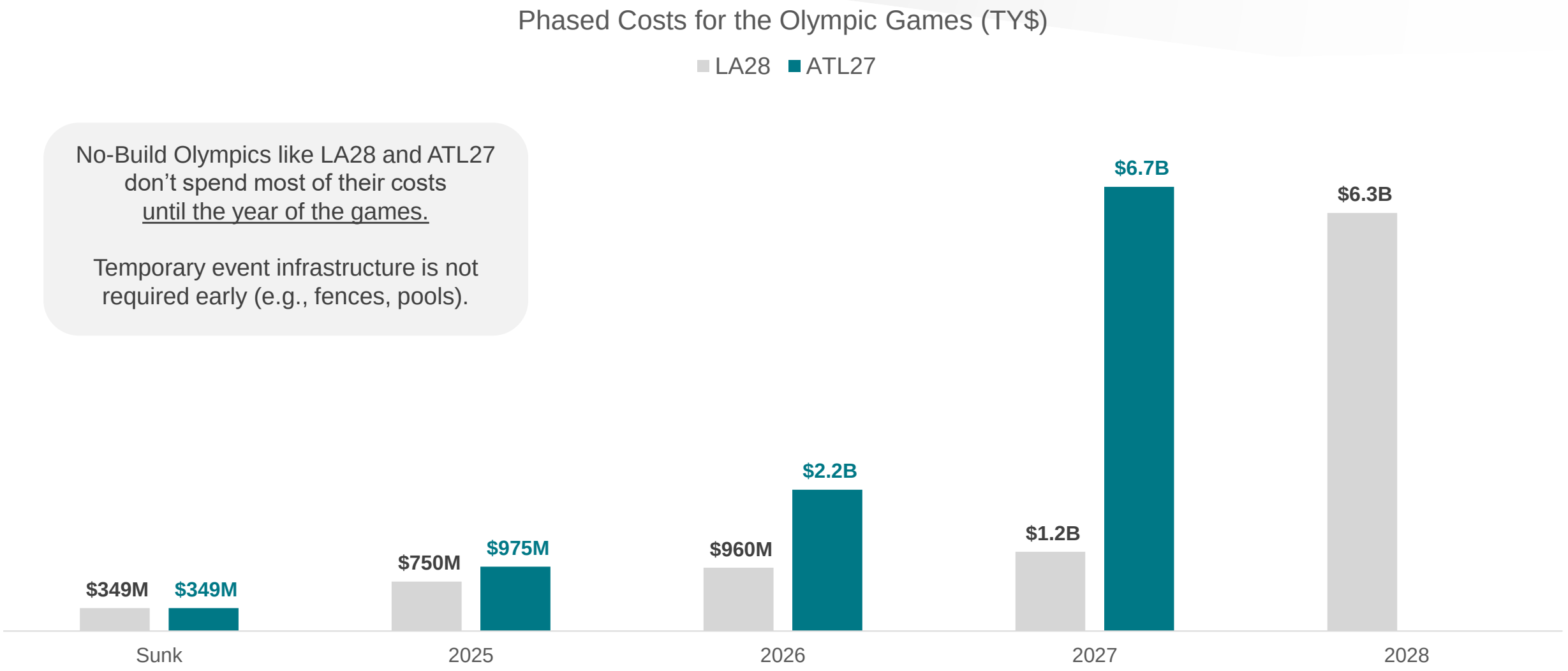
Several Factors Were Significantly Impactful to Our Estimate

The most impactful results were related to cost performance of the MARTA expansion work and acceleration of other efforts

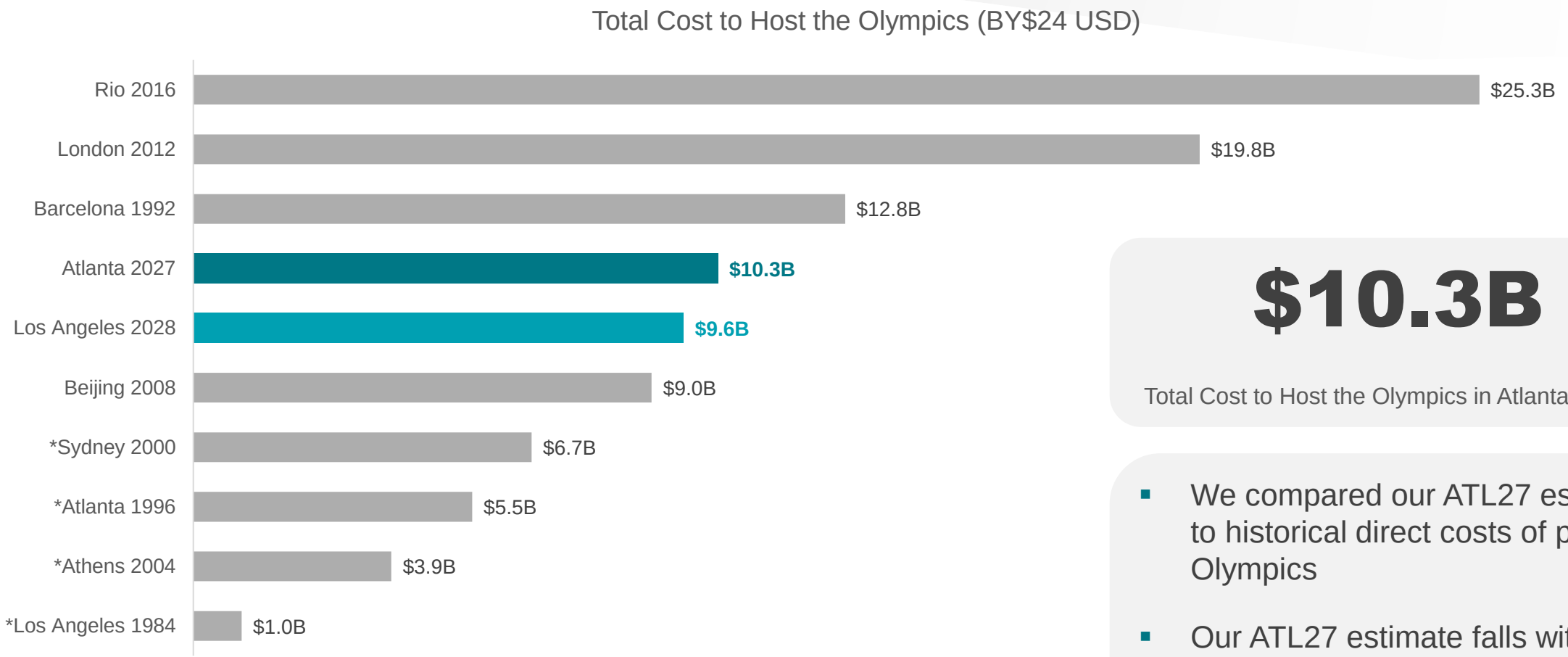
- There are many difficulties that transit projects face which often result in cost performance decreases
- Compressing work into a shorter time often requires more intensive resources, driving cost overrun to meet tight timelines
- There are many uncertainties surrounding the amount of power used during the Olympics as well as associated pricing



Our Phasing Analysis Shows that Spending is Highest During the Year of the Games in a No-Build Olympics



Our Total Cost is Within the Range of Previous Olympic Games



$10.3B

Total Cost to Host the Olympics in Atlanta in 2027

- We compared our ATL27 estimate to historical direct costs of past Olympics
- Our ATL27 estimate falls within the range of previous summer Olympics

Data source for chart (excluding ATL27 and LA28): 2024 Oxford Olympic Study

** Shown for comparison – however Olympic requirements were very different (significantly fewer athletes and events)*

We Also Estimated the Benefits That Will Result from the Relocation

$542M

Additional Benefits from Relocation

Decrease in societal disruption: $451M

Hosting the Olympics in Atlanta disrupts the lives of significantly fewer Americans compared to LA

Increased revenue from upgraded infrastructure: $41M

Venue upgrades to Bobby Dodd Stadium will bring in increased revenue over the next 15 years

Decreased carbon emissions: $50M

Decreased transportation gridlock across a smaller geographic footprint leads to carbon capture savings

Data sources: Four Decades of Work Access in Los Angeles, (Traffic) Congestion: Clearing or Continuing?, Google Maps API, Sport Venue Cost Calculator, California Cap and Trade Program

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Closing – Takeaways & Recommendation

In Summary,
Relocating to a Less Expensive City Offsets Many Other Costs

The two cities are not that different

- Both have multiple universities and professional sport venues
- Both have hosted the Olympics before

Some novel items will require investment

- MARTA expansion
- Additional qualifying tournaments

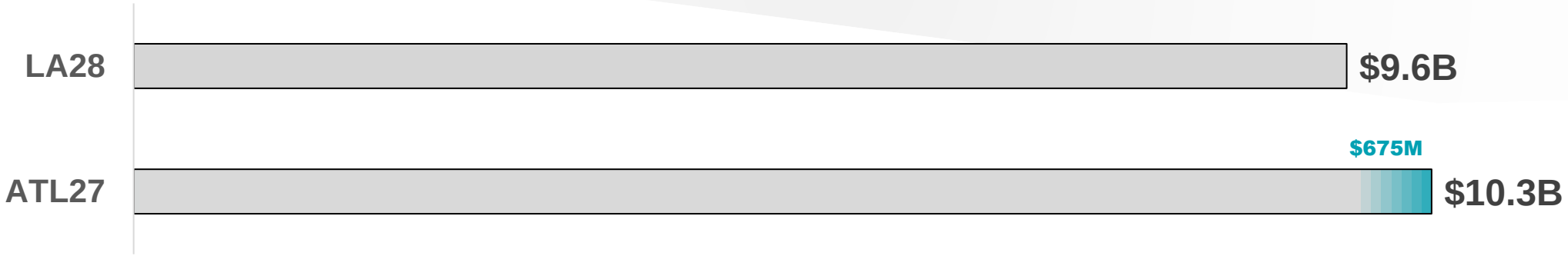
Acceleration also has an impact, but not enough to significantly outweigh other factors

- Most of the work have not begun yet
- LA28 has only spent a small percentage of their total budget (~6%) through 2025

Relocation provides a lot of cost avoidance

- Labor is cheaper in Atlanta
- Atlanta's venues are closer to the city hubs
- Atlanta's smaller population is proportionally less effected by city disruptions

We Recommend the ORAC Relocate and Accelerate



The additional **$675M** is only a fraction of the total cost to host the Olympics.

It's only a **7%** increase.

Given the risk at hand, the marginal added cost, and the added benefits:

We recommend that the ORAC follow-through with the decision to relocate the 2028 Los Angeles Olympics to Atlanta and accelerate the games to 2027.

This concludes our presentation. Thank you!

Questions?

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2025 ICEAA Cost Challenge Team

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Backup

Lessons Learned

- Fail fast! Be willing to give up on and swiftly move away from a lead if it's not panning out.
- Get comfortable with making broad and sweeping assumptions.
- Let the analysis drive the story – as opposed to fitting the analysis to a preconceived story.
- Thoroughly explore public data sources:
  - Dig deeper into familiar datasets: Databases like BLS and the U.S. Census offer far more than the high-level summary tables most users see.
  - Uncover hidden value in everyday tools: Applications like Google Maps often expose backend data that can be accessed freely with the right methods.
- Think outside the box with traditional cost estimating methods – something novel could be more applicable to the analysis.
- Spend your time proportional to the importance of the elements! It's alright to spend less time cross-checking costs that only account for 1% of the final value.
- Avoid analysis paralysis: With limited time and many valid but conflicting sources and methods, it's more valuable to make a well-reasoned decision and move forward than to chase the perfect answer.

Global Inputs and Unstated Assumptions

- Some Olympic events are planned to take place outside of the greater LA area. The estimate assumes that the softball and canoe slalom events that are planned to take place in Oklahoma City, OK will not be included in the ORAC, and therefore were excluded from the relocation portion of the cost estimate (acceleration was still considered).
- The upcoming Soccer World Cup in 2026 was assumed to not have an impact on the cost delta between the two cities – as both Los Angeles and Atlanta are scheduled to host the same number of games (eight games).
- The one-year acceleration may result in some athletes' eligibility to compete at the Olympics due to age restrictions – but we assumed that this would not have an impact on cost and therefore excluded it from the estimate.

Distributions, ranges, and sources not shown for brevity, but were comprehensively documented →

Global Inputs (for Risk & Uncertainty Analysis)	Value (50th)
# Tourists (Local)	10,800,000
# Tourists (Hotels)	4,200,000
# Tourists (Total)	15,000,000
# Olympic Days	16
# Estimate Years	2
# Countries Participating	207
# Athletes	11,198
# Sports	36
# Medal Events	351
Inflation	2%
Base Year	2024
b (Acceleration)	1.2
Labor Factor (between ATL and LA)	1.3
EUR to USD	1.1
MARTA CPI	1.00
# Hotels ATL	500
IOC Approval & Compliance Studies Cost (dollars per month)	520,833
IOC Approval & Compliance Studies Duration (months)	18
USA: Qualification Complexity for Athletics and Swimming (%)	6%
LA Cost / MMBTU	29
LA Usage / Person	18
ATL Cost / MMBTU	18
ATL Usage / Person	33
Market Return (Discount Factor)	10%
5G Unit Coverage Area (sq mi)	0.58500
LA Initial Budget	$6.8 B
ATL Dispersion Factor	0.93
Increase in Commute Time (LA)	17%
Increase in Commute Time (ATL)	19%

Combined Economic Index Table Used for Financial Data Normalization

Year	USA	Australia	Canada	France	Germany	Greece	Japan	Spain	UK	Brazil	China
1975	0.1716	0.0879	0.1831	0.7964	0.7811	0.6654	50.9171	3.9647	0.0528	0.0000	0.3191
1976	0.1814	0.1067	0.1909	0.9779	0.8333	0.8568	53.7995	5.4348	0.0757	0.0000	0.3522
1977	0.1932	0.1320	0.2223	1.0936	0.7972	0.9713	51.8792	7.6849	0.0904	0.0000	0.3590
1978	0.2080	0.1381	0.2598	1.0992	0.7083	1.0907	43.7625	9.2900	0.0890	0.0000	0.3501
...	...	...	...	...	...	...	...	...	...	...	...
2016	0.7651	1.0578	1.0580	0.7554	0.7216	0.7601	83.2388	0.7302	0.5629	2.3537	5.8775
2017	0.7814	1.0460	1.0524	0.7478	0.7177	0.7531	87.6477	0.7295	0.6057	2.2256	6.0738
2018	0.8005	1.0935	1.0745	0.7285	0.6985	0.7250	88.3933	0.7095	0.5978	2.6415	6.0688
2019	0.8150	1.1942	1.1217	0.7771	0.7475	0.7667	88.8432	0.7537	0.6355	2.9581	6.5208
2020	0.8251	1.2165	1.1419	0.7652	0.7337	0.7421	88.0951	0.7363	0.6391	3.9902	6.6712
2021	0.8638	1.1464	1.1039	0.7511	0.7302	0.7254	94.8076	0.7331	0.6105	4.5220	6.2956
2022	0.9329	1.3234	1.2238	0.8877	0.8765	0.8933	122.6807	0.8925	0.7356	4.7306	6.7067
2023	0.9713	1.4591	1.3185	0.9067	0.9044	0.9002	136.4660	0.8999	0.7785	4.7854	7.0686
2024	**1.0000**	**1.5154**	**1.3694**	**0.9239**	**0.9239**	**0.9239**	**151.3663**	**0.9239**	**0.7824**	**5.3889**	**7.1975**
2025	1.0200	1.5457	1.3967	0.9424	0.9424	0.9424	154.3936	0.9424	0.7981	5.4967	7.3414
2026	*1.0404*	*1.5766*	*1.4247*	*0.9612*	*0.9612*	*0.9612*	*157.4815*	*0.9612*	*0.8140*	*5.6066*	*7.4883*
2027	*1.0612*	*1.6081*	*1.4532*	*0.9804*	*0.9804*	*0.9804*	*160.6311*	*0.9804*	*0.8303*	*5.7188*	*7.6380*
2028	*1.0824*	*1.6403*	*1.4822*	*1.0000*	*1.0000*	*1.0000*	*163.8437*	*1.0000*	*0.8469*	*5.8332*	*7.7908*

Data sources: Bureau of Economic Analysis, World Bank

Every Olympics Has a “Tech Theme” – We Invented One for ATL27

Games	Tech Focus	Highlights	Sources
Atlanta 2027	**Keep the Olympics Alive!**	- **Enhanced 5G Deployment** - **ATL27 Olympics App**	- EU-Japan Centre for Industrial Cooperation - What the FCC’s Small Cell Ruling Means for Telecoms and Broadband - Impact of Federal Regulatory Reviews on Small Cell Deployment - Small Cells: Microcell, Picocell and Femtocell Comparison - Dgtl Infra
Los Angeles 2028	Sustainability, Smart Mobility	- Wireless EV charging road - AI + BIM for venue retrofitting - 3D laser scanning for accuracy - Upgraded traffic system (ATSAC)	- LA28 & Autodesk - NY Post – EV Charging Road- Spectrum News – ATSAC - Existing Conditions – 3D Scanning
Paris 2024	Surveillance, Green Energy, Digital Twin	- AI-powered surveillance cameras - 100% renewable electricity commitment - Digital twin of the city for planning	- The Guardian – Surveillance - CNBC – Green Olympics - Dassault Systèmes – Digital Twin
Beijing 2022	AR, Cloud, Athlete Tech	- AR-enhanced broadcasts - Games powered by Alibaba Cloud - Smart beds for athlete recovery	- Alibaba Cloud – Olympics - CNBC – AR Broadcast- - Business Insider – Smart Beds
Tokyo 2020	Robotics, Hydrogen, Automation	- Assistive robots for guests - Olympic Village powered by hydrogen - Facial recognition access control- Driverless shuttles	- Reuters – Robotics - Japan Times – Hydrogen - NEC Facial Recognition

We Estimated the Additional Costs of Advanced Technologies for ATL27

5G Deployment		
Coverage Parameters		
Microcell Base Unit Parameters	**Value**	**Source**
Small Cell Coverage Distance (sq mi)	0.585	dgtlinfra- Small Cells
Deployment Cost per Small Cell (USD)	$ 33,460	AccentureStrategy: Small Cell Deployment
NHPA/NEPA Review Costs per Small Cell (USD)	$ 9,730	
FCC Fees per small cell (USD)	$ 100	
Lifetime Maintenance (USD)	$ 1,890	aldensys: FCC Small Cell Ruling
Total Cost per unit	**$ 45,180**	

Method: Parametric
Technique: Geographic Dispersion
Cost: $10.4M

City Parameters/Calculations			
Deployment Parameters	**LA**	**ATL**	
Land Area: City (sq mi)	471	135	
Number of Small Cells Needed (by area)	805	232	
Existing Small Cells	1796	0	
Total Small Cells Needed	0	232	
Total Cost of 5G Deployment	**-**	**$**	**10,481,760**

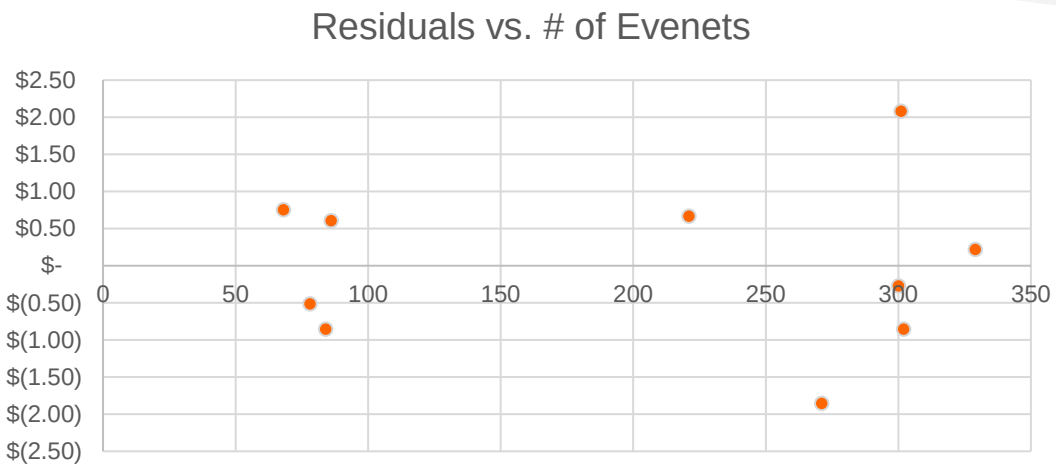
$14M

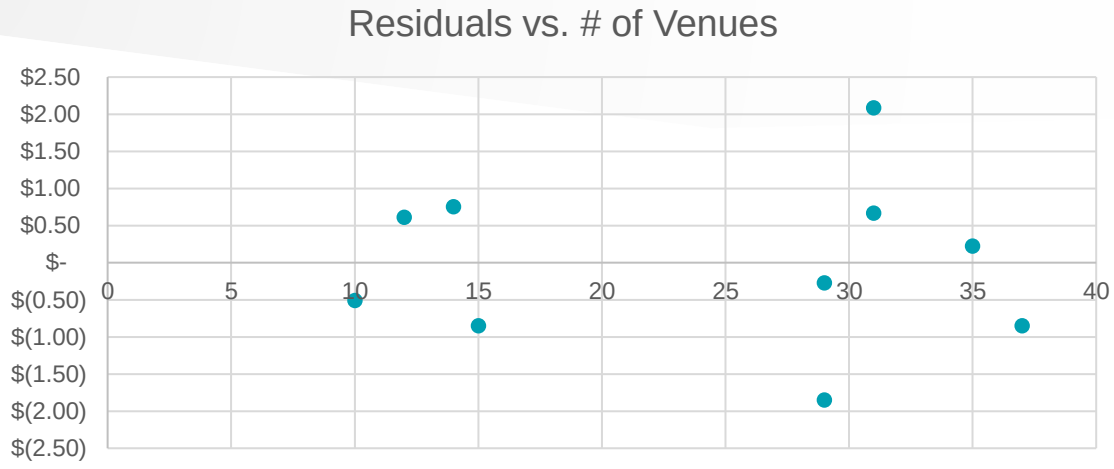
Total Cost for Advanced Technologies
(Risk Adjusted, 80th Percentile, BY$24)

App Development		
Cost of Official Tokyo 2020 App (JPY TY2020)	$157,100,000	EU Japan Centre
Cost of Tokyo 2020 App (BY24 USD)	$1,783,300	
Assumed Time for Tokyo App Development (Yr)	5	
Time for ATL App Development (Yr)	2	
Cost Growth Factor	2.5	
Acceleration Factor	3.002811085	
Cost of Official ATL 2027 App (BY24 USD)	**$3,571,613**	

Method: Analogy
Technique: Acceleration Factor
Cost: $3.6M

ICR Residuals – Details





- Visual analysis suggests no heteroskedasticity present in the regression
- Statistically validated through Breusch-Pagan test (p-value of 0.56) and simplified White Test (p-value of 0.51)

Data sources: White Test for Heteroskedasticity

Technomics
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End