High Performance K-12 Building Design

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D11's New Schools

- 4 different design teams
- Attractive designs
- Highly functional
- Excellent comfort levels
- D11's best student achievement scores

Energy Performance

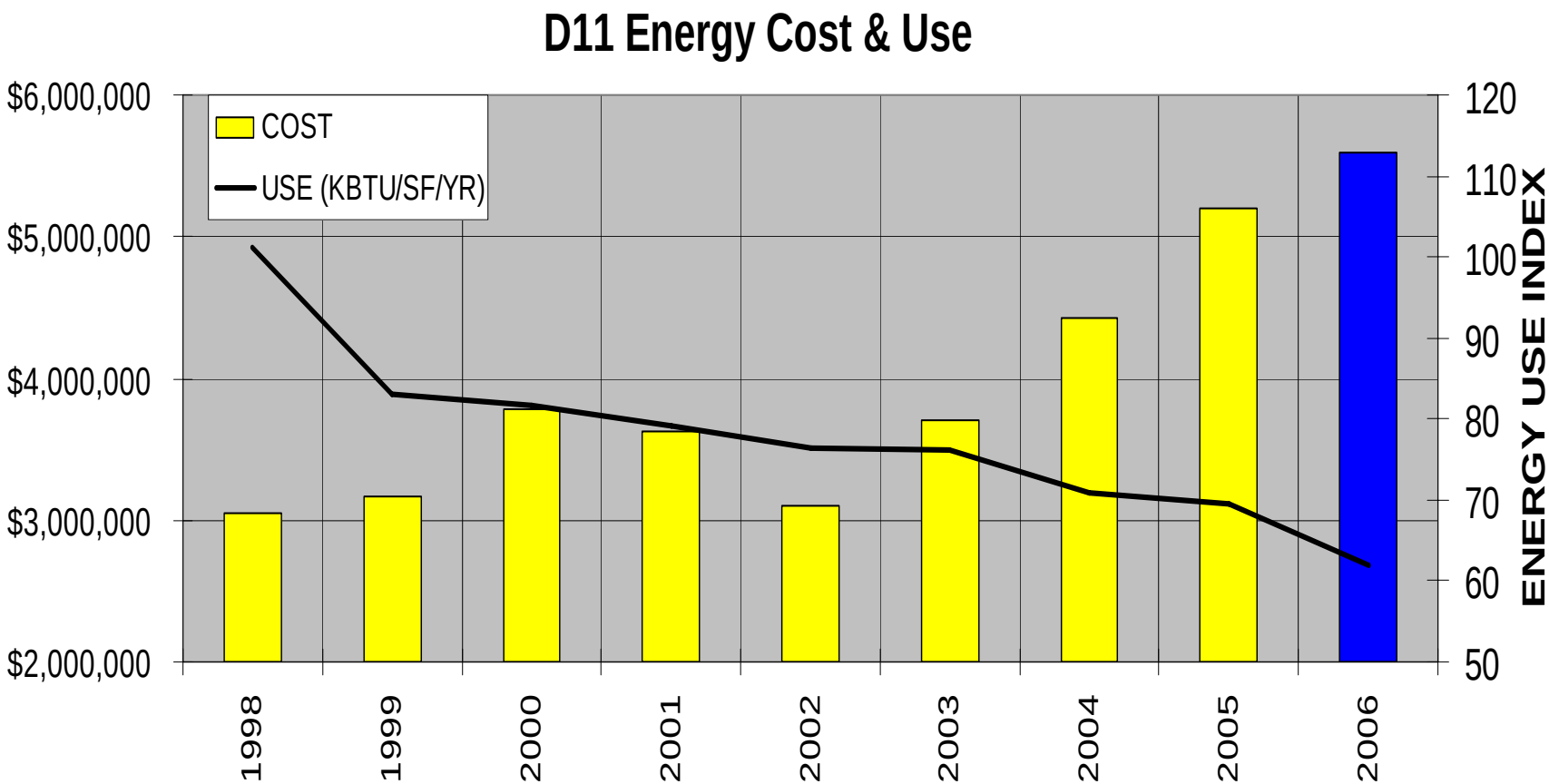
- Trailblazer Elementary 68 KBTU/SF/YR
- Scott Elementary 71 KBTU/SF/YR
- Jenkins Middle 76 KBTU/SF/YR
- Tesla Middle 101 KBTU/SF/YR

- D11 Average 70 KBTU/SF/YR
- National K-12 80 KBTU/SF/YR

Energy Use Index

(Gas+Electric)/Total Sq. Ft. = KBTU/SF/YR

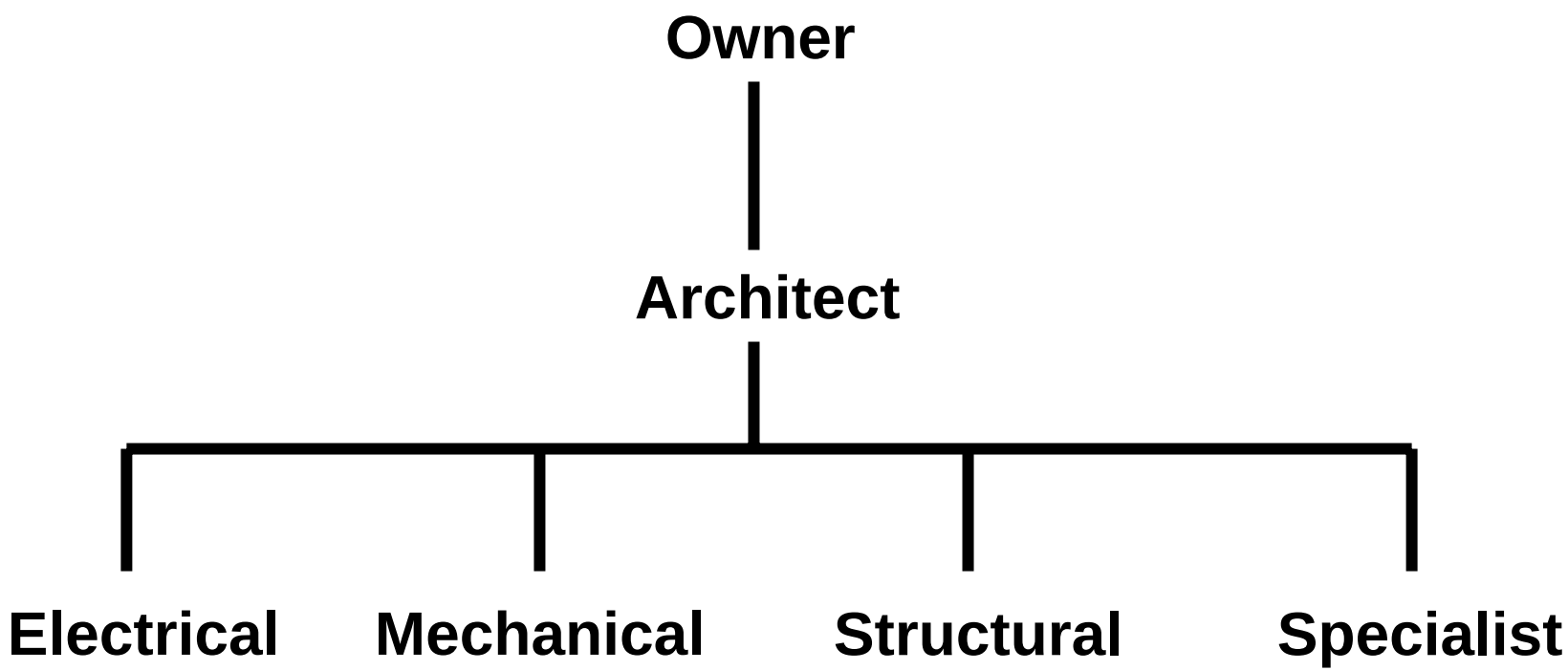
Why It Matters To D11



Lessons Learned

- No clear understanding of HP buildings
- No clear understanding of HP design
- No specific building energy goals
- Traditional “architect down” design
- Passive during design

Traditional Design Hierarchy



Traditional Design Process

- Owner sets budget & functional scope
- Architect designs for form & function
- Mechanical & electrical systems must fit around architect's design
- Minimal interaction between disciplines
- Fixed design fees – no incentive

High Performance Design Process

- Form & function designed around HVAC and lighting systems
- Maximizes use of natural lighting, heating, cooling, ventilation
- Reduced equipment sizing & run time
- Reduces energy use

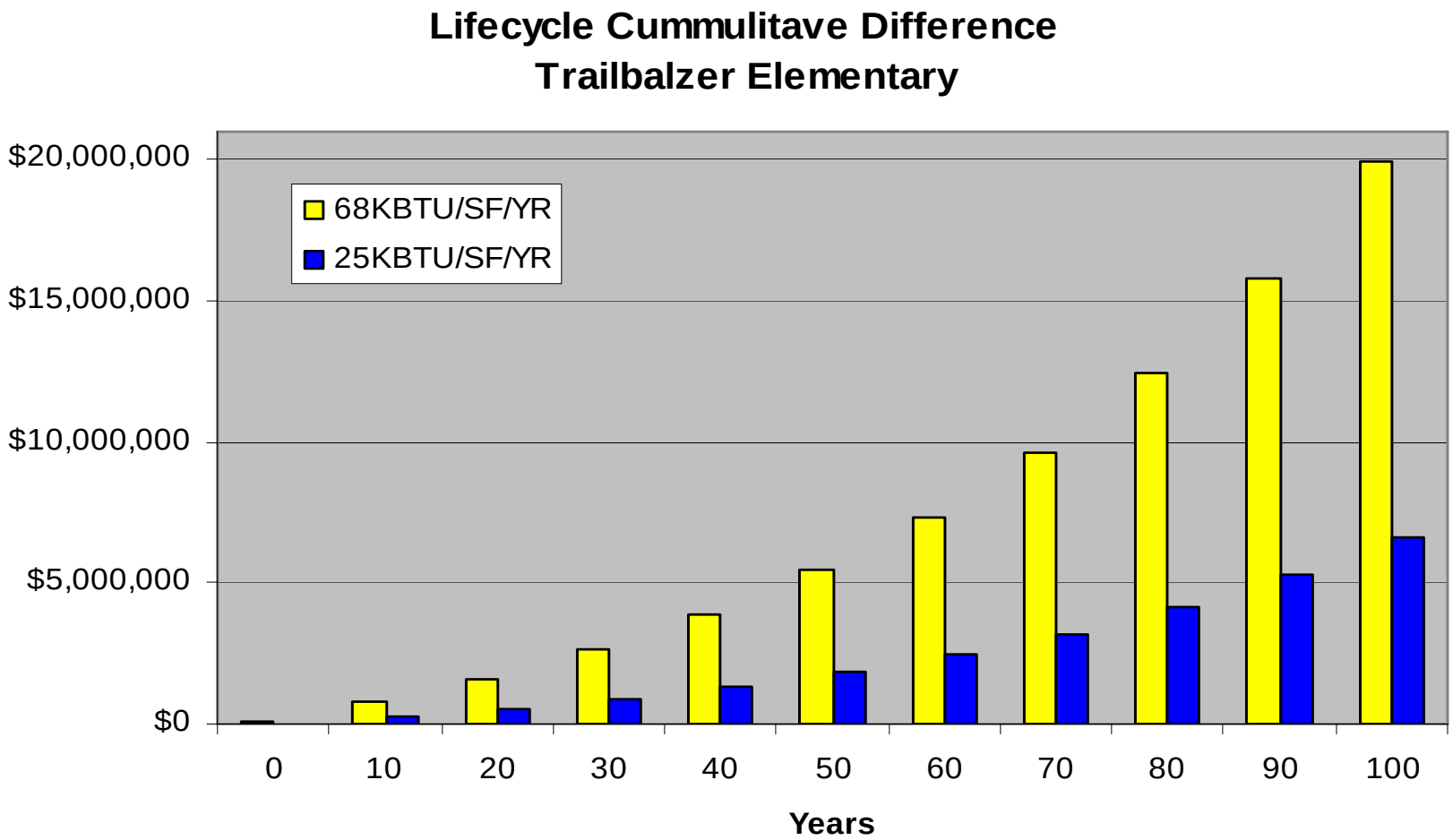
Integrated Design Team

- All team members onboard from concept
- Energy goals clearly understood
- Architect allows team to interact freely & collaboratively to achieve energy goals
- The power of performance based fees
- Design process costs more

High Performance Energy Difference

- K-12 High Performance 25KBTU/SF/YR
- K-12 National average 80KBTU/SF/YR
- Does not have to cost more to build
- LEED certification doesn’t guarantee high performance
- Higher design cost - quick payback

The Lifecycle Cost Difference



Owner Responsibilities

- Understands the HP concept
- Sets specific energy goals
- Finds the right design team
- Budgets for higher design fees
- Hire an integrated design process expert

D11 Building Performance Goals

- 25 KBTU/SF/YR - total building energy
- 2.4 GAL/SF/YR - domestic water
- 4.5 GAL/SF/YR – irrigation
- Power factor > 0.95 lag
- Elementary school construction <$110/SF

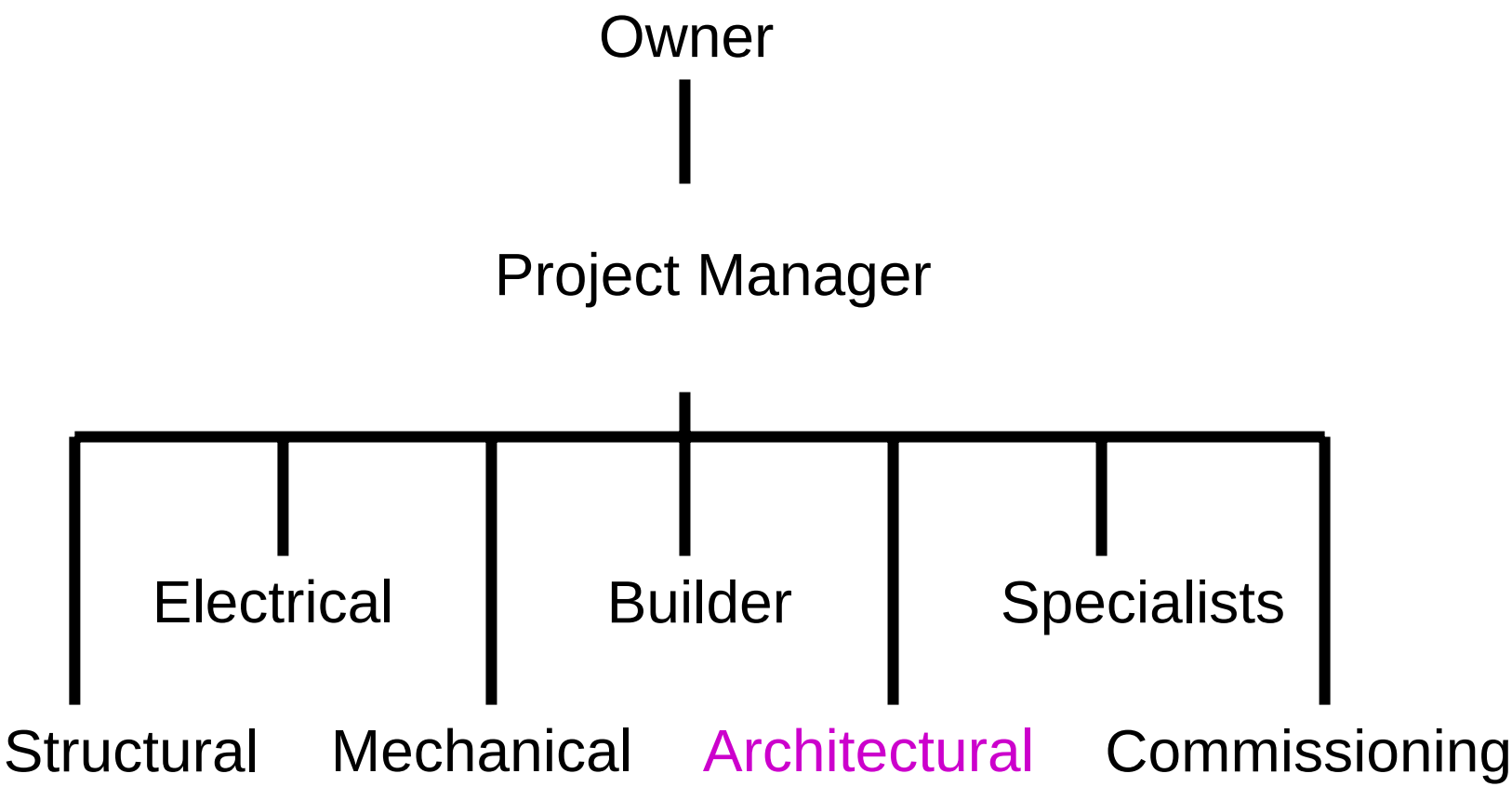
D11 Authored Documents

- Educational / Functional Specifications
- High Performance Design Specifications
- RFP for design services
- Performance based fee schedule

Finding The Right Team

- Ask for documented KBTU/SF/YR results for similar building type
- Demonstrated use of integrated design team approach
- Willing to accept performance based fees
- Don’t rely on LEED certification

Owner Direct
A New Alternative



Owner Direct
Design Team Structure

- Owner direct – HP expert project manager
- Owner direct - all design disciplines
- Design team free to meet design goals collaboratively without traditional barriers
- Performance bonus for all members.

Useful Tools

- During design - EPA Energy Star "Target Finder" tool - KBTU/SF/YR
- During verification - EPA Energy Star "Portfolio Manager" benchmarking tool KBTU/SF/YR

Conclusion

- High performance buildings are achievable
- They don’t have to cost more
- They already exist - go visit them
- But it won’t happen without a educated determined owner – at least not yet!
- It’s the right thing to do - for generations to come

Contact Information

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