Designing for Capital Efficient Projects
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Designing for Capital Efficient Projects
Project Objectives and Strategies

Project Priorities

1. Security, Safety, Health and Environmental Performance

2. Capital Efficiency

3. Schedule / Quality / Reliability / Operating Cost
   - Required but Subject to Cost Optimization

Strategies

- Aggressive capital efficiency processes in every part of the project development and execution
- Pursuit of low cost options requires change in behavior

*Insanity: doing the same thing over and over again and expecting different results.*
- Albert Einstein
Fit for Purpose Design

- Accept some capacity risk
  - Equipment sized to capacity
  - No debottleneck capacity
  - Reduced footprint minimizes interconnecting piping distance

- Operability and reliability based risk approach
  - Fewer equipment spares
  - Reduced instrumentation
  - Minimized ladders and platforms
  - Fewer permanent maintenance facilities, e.g. overhead lifts

Fit for Purpose Design requires organizational alignment on risk acceptance
I want a new truck

Design Basis:

- The only safety features not on the base model I need is a backup camera
- I think I can justify a tow package so I don’t have to rent a truck to pull the boat.
- The only amenity I really want is leather seating
### Ford F-150 Platinum Sticker

**Fuel Economy**

- **MPG**: 19

**Annual Fuel Cost**

- **Cost**: $2,750

**Gasoline Vehicle**

- **Fuel Efficiency**
  - **Highway**: 23 MPG
  - **City**: 17 MPG

**Government 5-Star Safety Ratings**

- **Overall Vehicle Score**
  - **Frontal**: 5 stars
  - **Side-Impact**: 5 stars
  - **Rear-Impact**: 4 stars

**Additional Information**

- **Total MSRP**: $62,920.00

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*Designing for Capital Efficient Projects*
**Ford F-150 XL sticker**

<table>
<thead>
<tr>
<th>Includes</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>Rear view camera</td>
<td>$175</td>
</tr>
<tr>
<td>Tow Package</td>
<td>$250</td>
</tr>
<tr>
<td>Leather seating</td>
<td>$1050</td>
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**Total**  

= **$4750**
SmartSPEND – What’s Different?

- Uses a Base Facility Design instead of a Reference Design
- Bottom-up approach rather than top-down
- Uses an NPV-based economic filter to justify additions.
  - What is an additional day of availability worth?
  - Payback criteria to save Operations cost?
- Makes NPV the single objective arbiter of project scope and execution configuration changes
- Sets far earlier the project scope, design basis, and economic criteria for subsequent changes
- Different than Value Engineering
SmartSPEND Phase 1 / 2 Project Work Flow

Executive Alignment on Project Philosophy

Project Alignment on SmartSPEND Base:
- KSS Base PFD’s / Equipment List
- Define Economic Justification
- Align on Reliability Data
- Develop Estimate Approach
- Owner low-cost design practices
- SmartSPEND Base Design Philosophies
- Local requirements

Owner & Contractor SME’s

SmartSPEND Workshops

Discuss / Debate Base Facility KSS Design Philosophies With Discipline (s)

Value Increase?

Defend project Design Philosophies to Executive (Owner + contractor) Stakeholders

Yes

Approved Project Philosophies

No

Revise Recommendations Or Reject Change

Executive Alignment on Project Philosophy

SmartSPEND Phase 1

FEL / FEED

Phase 2

1 – 4 weeks depending on complexity of project
SmartSPEND Benefits

- Forces Decisions in Correct Order – 1000 ft (overall facility philosophy) level to 100 ft (discipline philosophies) level to 10 ft (specification) level
- Early Critical Scope Decision Making by going through 16 Base Design Philosophies (such as):
  - Equipment (sparing, margin, turndown req.)
  - Facility Layout Philosophy (bypasses, servicing of equipment on line, enclosures, valve access, human factors, mechanical handling)
  - Coatings (un-insulated CS, insulation, surface prep, RV tail pipes)
  - Civil / Structures / UG (primary / secondary steel, weight estimate, CG analysis, mating connection, structural analysis, ditches vs. culverts, drainage slope, rainfall design)
  - General Arrangement (access walkways, platforms, access frequency)
  - Piping Engineering (pipe wall schedule, NDE)
  - Metallurgy (corrosion allowance, material selection, Design Temperature)
  - Equipment (where to use industry or supplier standards)
  - Instruments & Control (local, standardization, fit for person)
- Creates Natural Team Alignment
- Gets Engagement of SME’s
Value Capture - Cost Estimating Toolkit

- Traditional cost estimate processes improved to reflect a more collaborative, integrated workflow
  - Predictive capability of cost estimating toolkit to generate quantities & hours
  - Enables better design / cost trade-off decision making earlier in project life-cycle to ensure cost competitiveness

**Cost Models**
Comprehensive cost models for key process units

**Integration**
Integration of Cost / Design Engineering & Pre-FEED Contractor resources

**Cost Estimate**
- Incorporation of capital efficiency objectives with pre-FEED definition
- Transparent representation of risks and opportunities documented for stakeholder alignment and assessment
- Provides basis for effective cost tracking

**Expert Input**
Execution, construction, & cost engineering experts

**Market Data**
Comprehensive market intelligence to inform labor, material, & engineering costs

**Estimating Work Process**
SmartSPEND – Cost Trending

- 78% savings on spared equipment
- 40% savings on trended bulks

10-25% Total Cost Savings from ‘Reference Design’
Top Takeaways

1. SmartSPEND work process produces traceable results
2. Must have owner executive level commitment to drive discipline and to drive low cost, fit for purpose Standards & Specifications.
3. SmartSPEND is not Value Engineering where you try and reduce certain costs
   - Start with the lowest cost and add in what is justified.
   - SmartSPEND is owned by Owner / Contractor Project Management.
4. Once project design philosophies are approved, project has strong basis for change management.
5. Executive commitment fosters early alignment of Owner and Contractor SME’s.
   - After workshops, SME’s know the project and are committed to capital efficient approach.
6. If done right capital efficiency becomes the norm on the project.
   - Implemented projects continued to realize additional savings in equipment even as the count increased.