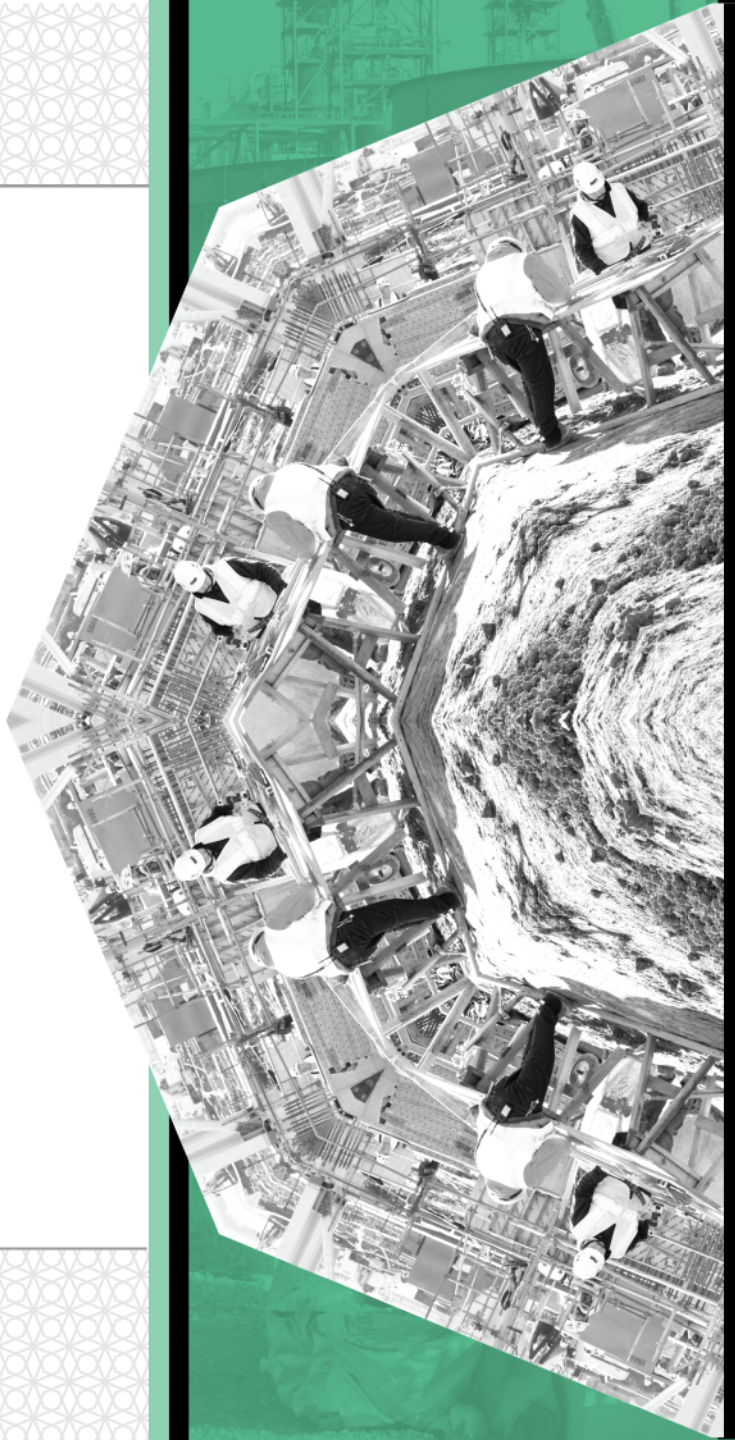
PerspECCtive

Theme:
Annual Conference Theme

Designing for Capital Efficient Projects



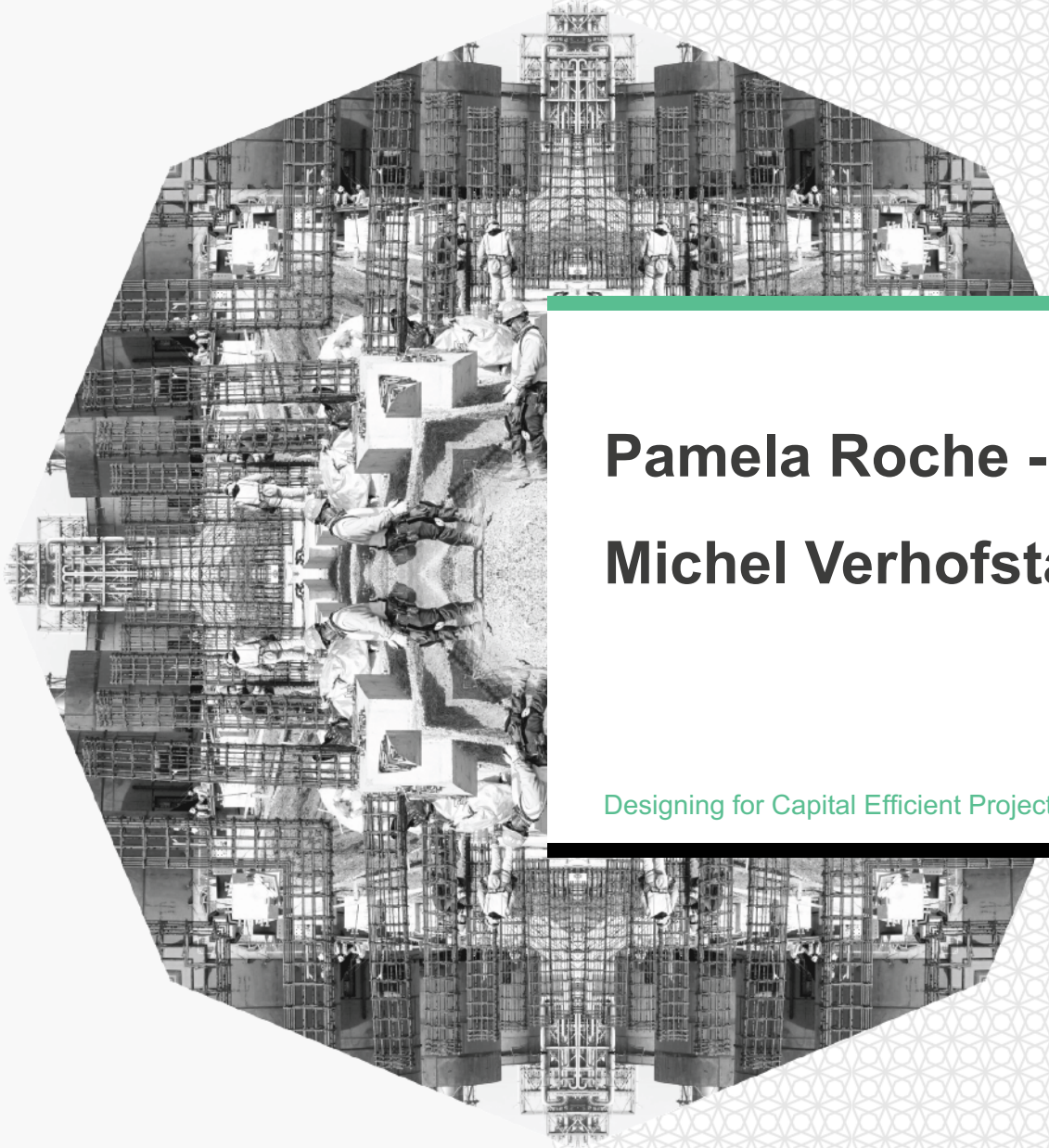
№ 49

Year:
2017

Date:
Sept. 6-9

Location:
Boca Raton, FL

ECC



Pamela Roche - KBR

Michel Verhofstad - ExxonMobil

Designing for Capital Efficient Projects

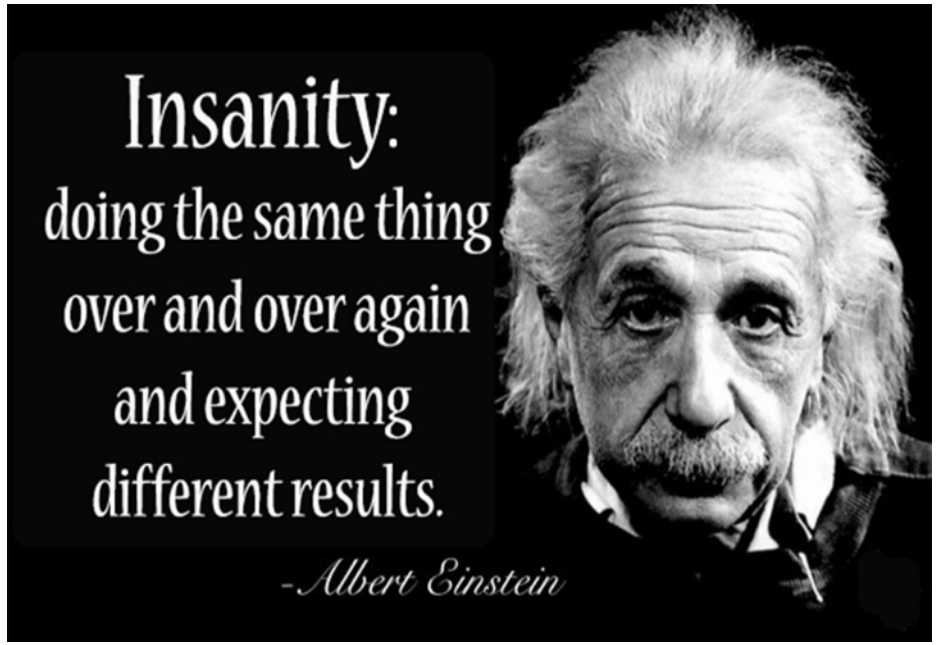
Project Objectives and Strategies

Project Priorities

1. Security, Safety, Health and Environmental Performance
2. **Capital Efficiency**
3. Schedule / Quality / Reliability / Operating Cost
   - Required but Subject to Cost Optimization

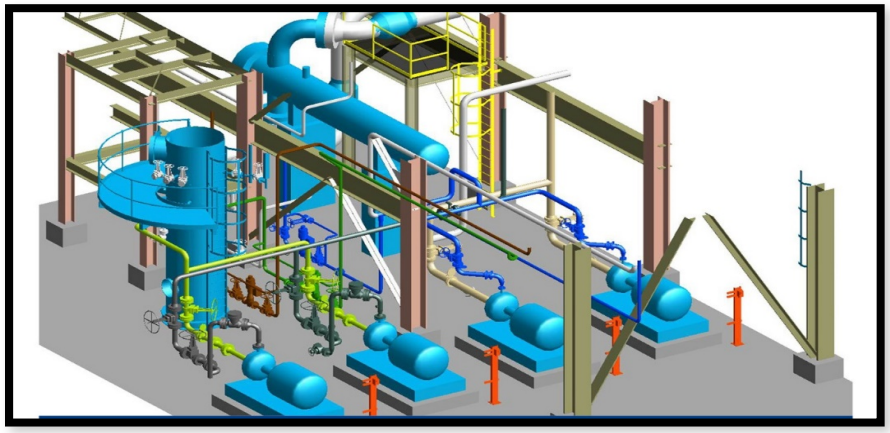
Strategies

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

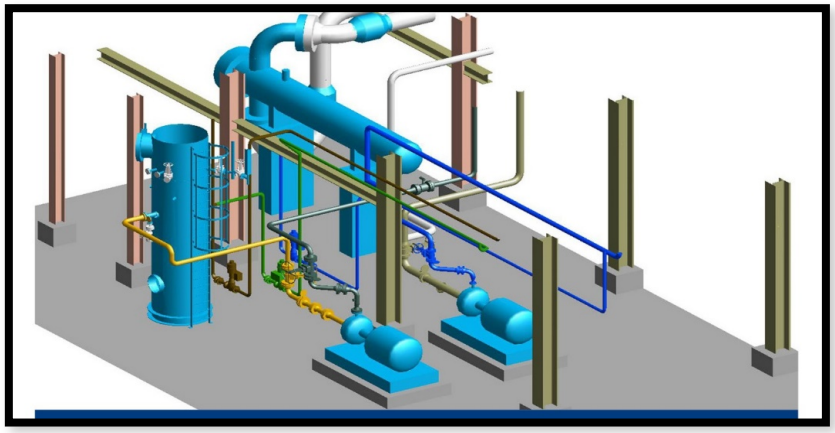


Fit for Purpose Design

Typical Facility Model



'Fit-for-Purpose' Model



Fit for Purpose Design requires organizational alignment on risk acceptance

- 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

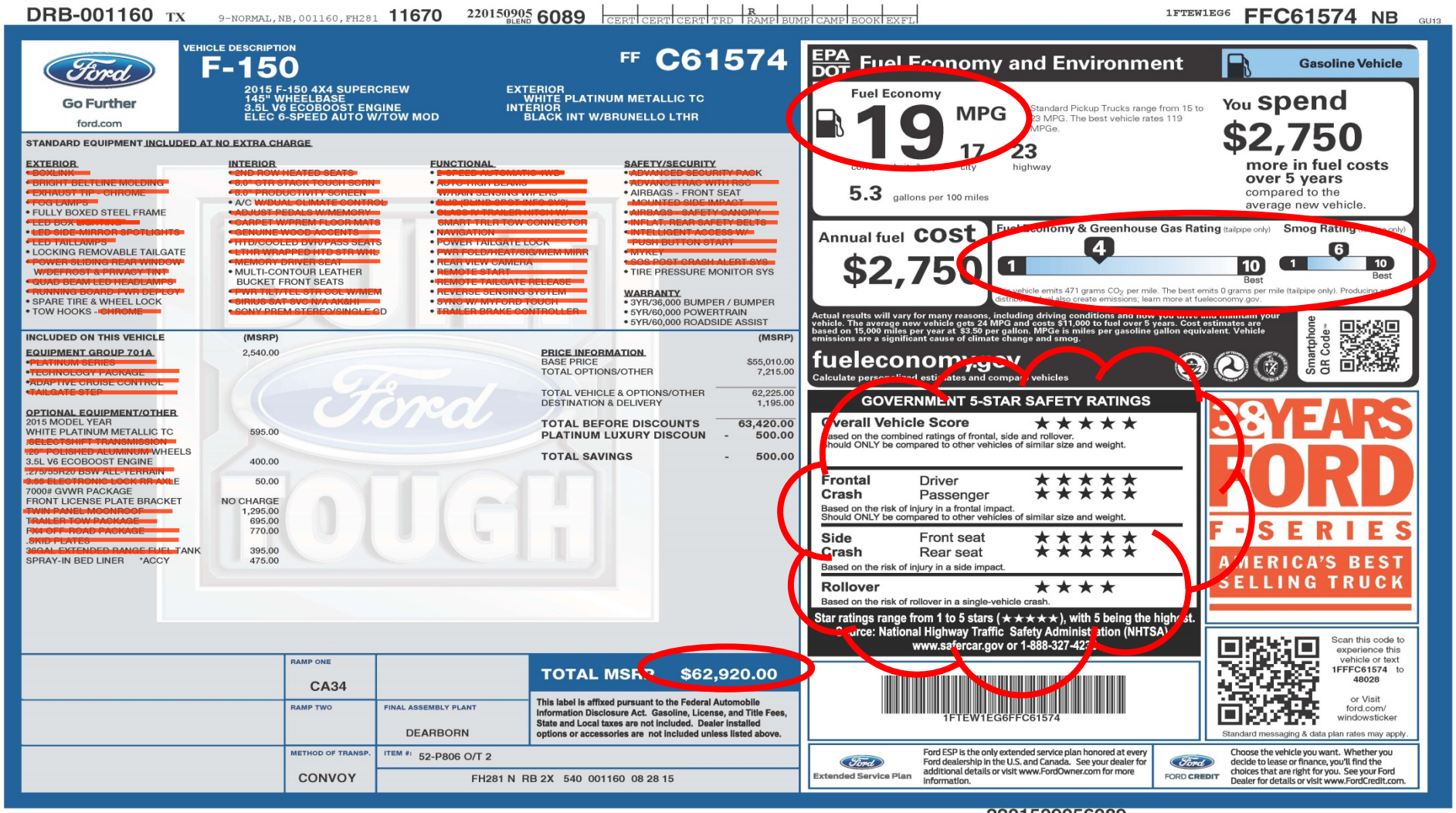
Value Moment – F150

I want a new truck

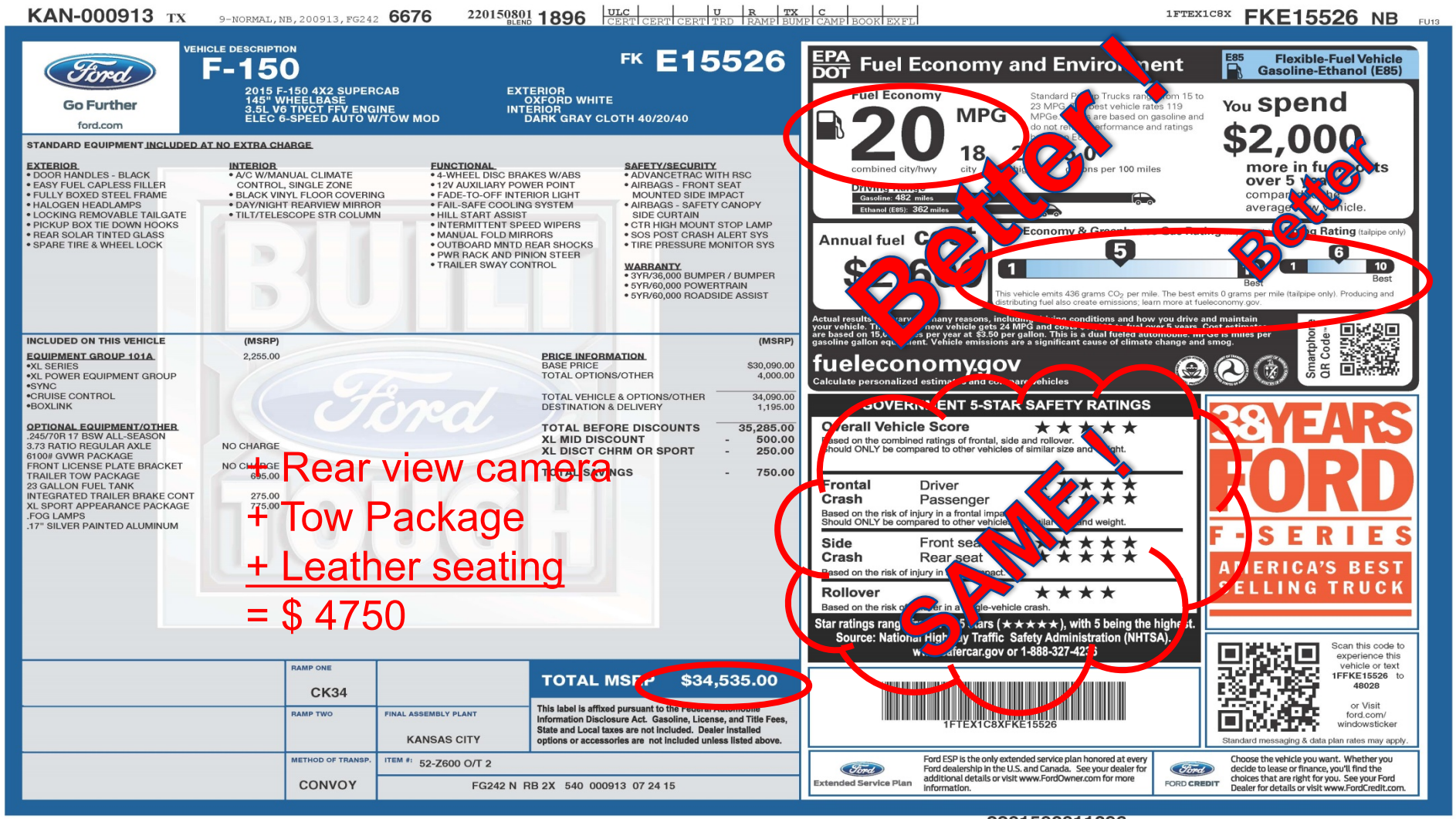
Design Basis:

- 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



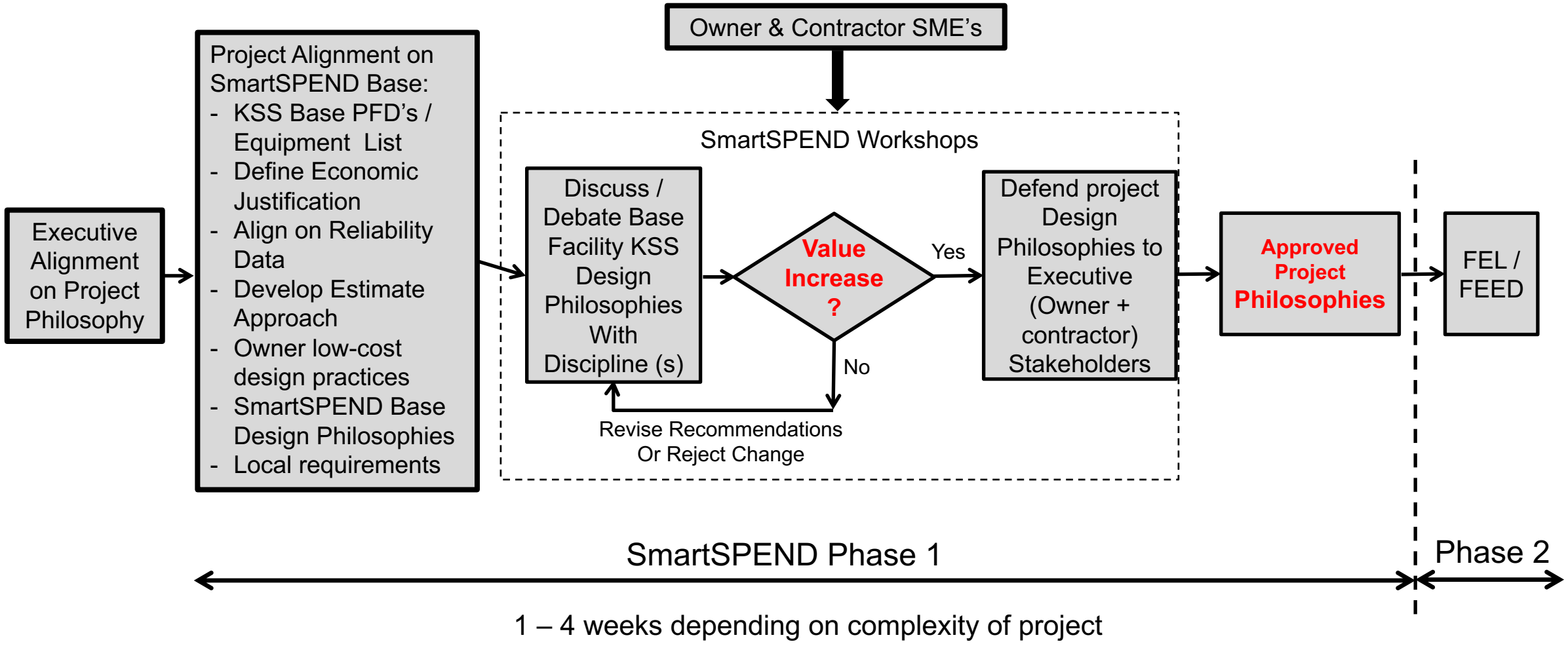
Ford F-150 XL sticker



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

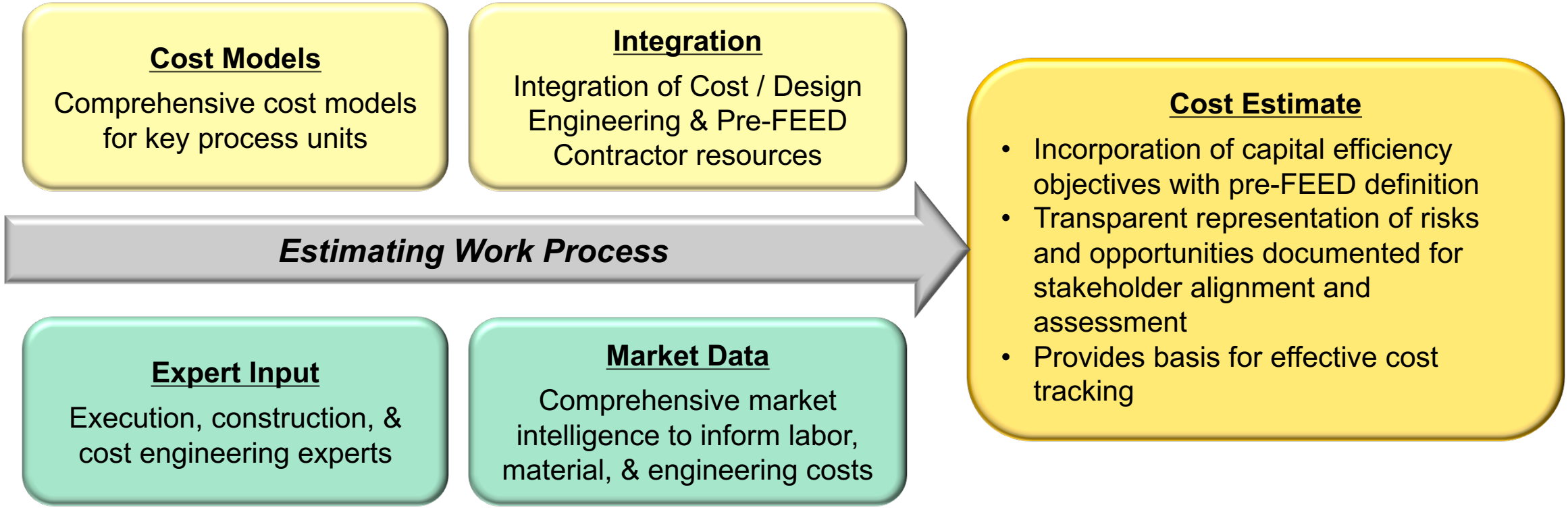


SmartSPEND Benefits

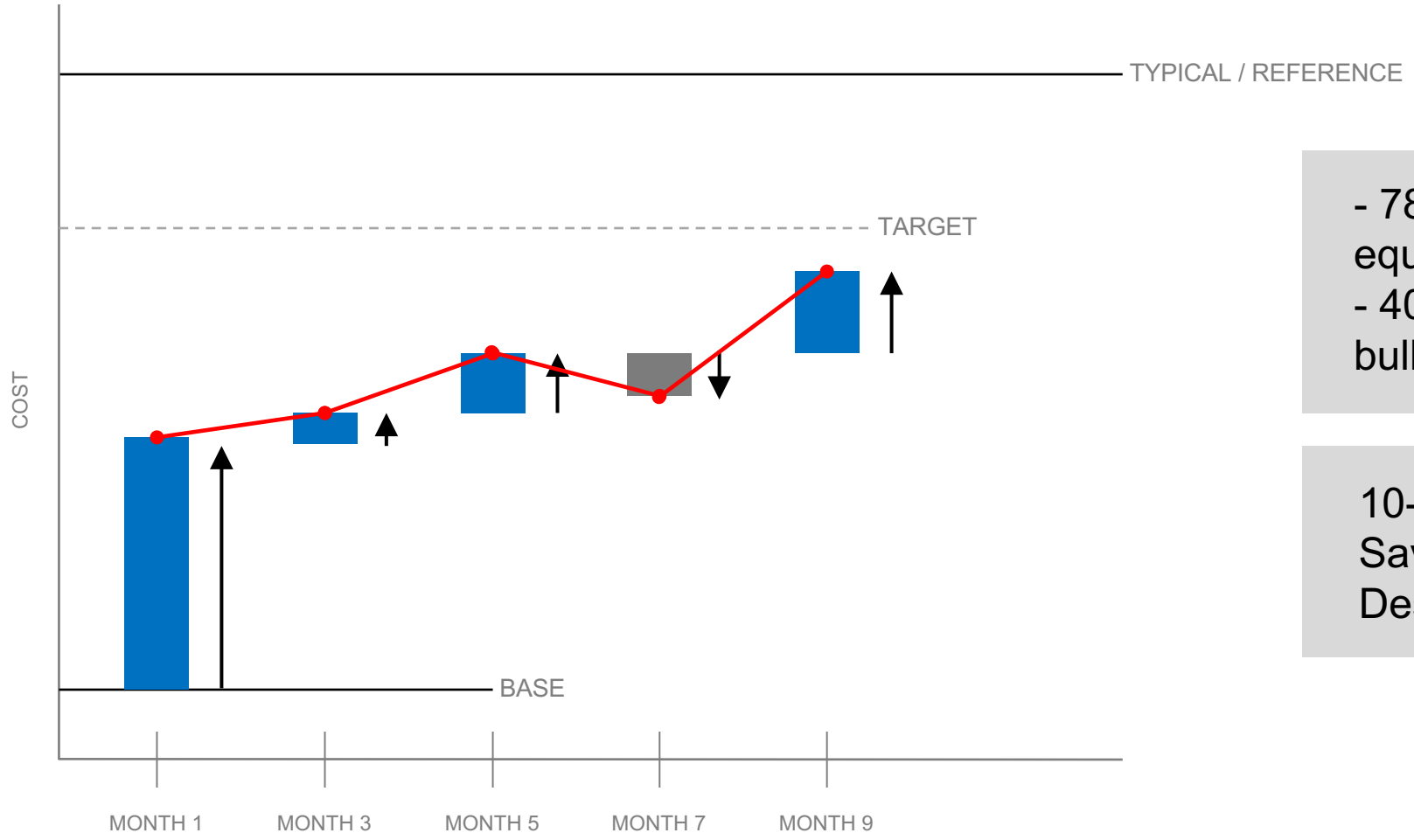
- Forces Decisions in Correct Order – 1000 ft (overall facility philosophy) level to 100 ft (discipline philosophies) level to 10ft (specification) level
- Early Critical Scope Decision Making by going through 16 Base Design Philosophies (such as):
  - Equipment (sparing, margin, turndown req.)
  - Facility 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



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.