

Lessons Learned from Consulting and Construction Projects

UT-Dallas Project Management Symposium
Mike Wheeler, Fluor Corporation

- ENERGY & CHEMICALS
- INFRASTRUCTURE & POWER
- MINING & METALS
- LIFE SCIENCES & ADVANCED MANUFACTURING
- GOVERNMENT
- DIVERSIFIED SERVICES



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Fluor Overview

- ▶ **One of the world's largest** publicly traded engineering, procurement, fabrication, construction and maintenance companies
- ▶ **Designs, builds and maintains** capital-efficient facilities for clients on six continents
- ▶ Delivers **integrated solutions** for clients in the energy & chemicals, government, life sciences & advanced manufacturing, infrastructure & power, mining & metals and operations & maintenance market sectors
- ▶ Serving more than **4,000** clients in over **60** countries
- ▶ **#153** on the 2018 **FORTUNE® 500** list with revenue of **\$19.2** billion in 2018
- ▶ More than **53,000** employees executing projects globally
- ▶ **107-year Fluor** legacy



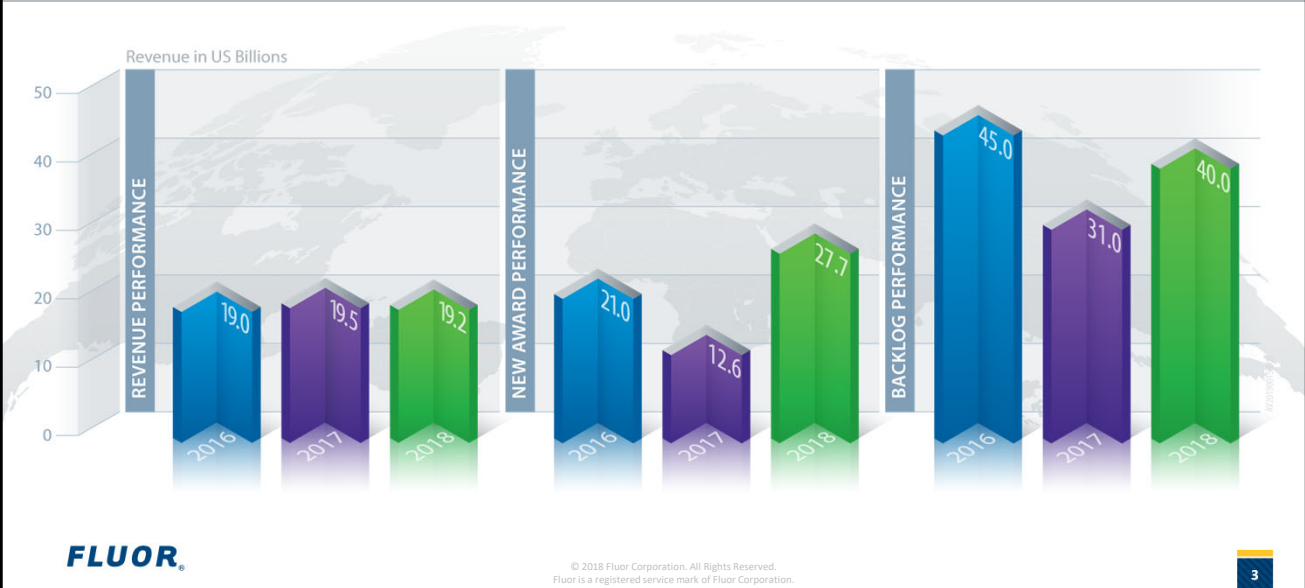
Fluor Corporate Headquarters | Dallas, Texas

We transform the world by building prosperity and empowering progress.



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Corporate Financial Performance



Global Differentiators

- ▶ Provide **fit-for-purpose** EPFCM services and cost-competitive solutions to optimize each client's capital project
- ▶ Master **supply chain advantages** by using our global procurement network and in-country suppliers
- ▶ **Self-perform fabrication** at our strategically located fabrication yards
- ▶ Execute tough projects in **challenging and remote environments** by leveraging our global resources
- ▶ Deliver **sustainable projects** through an uncompromised focus on health, safety and environmental excellence



COOEC-Fluor Fabrication Yard | Zhuhai, China

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Integrated Solutions

Comprehensive Life-Cycle Services for Client Capital Assets

Design	Engineering	Procurement	Fabrication	Construction	Start-up	Diversified Services
<ul style="list-style-type: none"> ▶ Feasibility Studies ▶ Conceptual Design ▶ Scope Definition ▶ Process Simulation ▶ Technology/License Evaluation ▶ Estimating ▶ Project Financing ▶ Routing ▶ Siting ▶ Permitting ▶ Advanced Process Modeling 	<ul style="list-style-type: none"> ▶ Front-end Engineering ▶ Detailed Engineering ▶ Modular Construction ▶ Process Simulation ▶ Safety Planning ▶ Systems Integration ▶ Planning & Scheduling ▶ Cost Control ▶ Fabrication ▶ Advanced Work Packaging 	<ul style="list-style-type: none"> ▶ Low-Cost Country Sourcing ▶ Requirements Planning ▶ Purchasing ▶ Materials Management ▶ Supplier Quality ▶ Contracts Management ▶ Fabrication ▶ Logistics ▶ Expediting ▶ Warehousing ▶ Contract Staffing 	<ul style="list-style-type: none"> ▶ Self-Perform Fabrication ▶ Modular Construction ▶ Sourcing ▶ Purchasing ▶ Quality Control ▶ Safety Programs ▶ Material Control ▶ Contractor Management 	<ul style="list-style-type: none"> ▶ Self-Perform Construction ▶ Project & Program Management ▶ Construction Management ▶ Craft Staffing & Training ▶ Field Mobilization ▶ Contractor Management ▶ Modular Construction ▶ Safety Programs ▶ Quality Control ▶ WorkFace Planning ▶ Equipment, Tools & Fleet Services ▶ Rigging ▶ Scaffolding 	<ul style="list-style-type: none"> ▶ Precommissioning ▶ Engineering Support ▶ Systems Checkout ▶ Commissioning ▶ Turnover ▶ Initial Production ▶ Validation ▶ Plant Readiness 	<ul style="list-style-type: none"> ▶ Asset Life-Cycle Solutions ▶ Asset Performance Improvement ▶ New Asset Readiness ▶ Maintenance ▶ Operations ▶ Plant Engineering Services ▶ Staffing Resources

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Client Market Portfolio

 <p>Energy & Chemicals</p> <ul style="list-style-type: none"> ▶ Biofuels ▶ Carbon Capture ▶ Chemicals & Petrochemicals ▶ Gas Processing & Gas Treating ▶ Gasification, Gas to Liquids/Chemicals, & IGCC ▶ Heavy Oil Upgrading & Oil Sands ▶ Hydrocarbon Transportation - Pipelines ▶ Liquefied Natural Gas (LNG) ▶ Offshore Oil & Gas Production ▶ Onshore Oil & Gas Production ▶ Operations & Maintenance ▶ Petroleum Refining ▶ Polysilicon ▶ Sulfur Recovery ▶ Utilities & Offsites 	 <p>Infrastructure & Power</p> <ul style="list-style-type: none"> ▶ Aviation ▶ Bridges ▶ Commercial & Institutional ▶ Environmental Compliance ▶ Heavy Civil ▶ Offshore Wind Farms ▶ Operations & Maintenance ▶ Ports & Marine Terminals ▶ Public-Private Partnerships ▶ Rail & Transit ▶ Renewable Energy ▶ Thermal Power ▶ Toll Roads & Highways 	 <p>Mining & Metals</p> <ul style="list-style-type: none"> ▶ Fertilizer ▶ Metals ▶ Metals Process Expertise ▶ Mining ▶ Mining Process Expertise ▶ Operations & Maintenance 	 <p>Life Sciences & Advanced Manufacturing</p> <ul style="list-style-type: none"> ▶ Biotechnology ▶ Carbon-Based Materials ▶ Consumer Products ▶ Food & Beverage ▶ Glass-Based Materials ▶ Medical Devices ▶ Operations & Maintenance ▶ Pharmaceuticals ▶ Silicon-Based Materials ▶ Water 	 <p>Government</p> <ul style="list-style-type: none"> ▶ Contingency Operations ▶ Government & Nuclear Services 	 <p>Diversified Services</p> <ul style="list-style-type: none"> ▶ Asset Life-Cycle Solutions ▶ Asset Performance Improvement ▶ New Asset Readiness ▶ Maintenance ▶ Operations ▶ Plant Engineering Services ▶ Power Services ▶ Staffing Resources
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Fluor Is Transforming How EPC Execute Capital Projects

- ▶ Leveraging Fluor domain expertise together with IBM T.J. Watson Research Center to create two proprietary predictive analytics systems
 - EPC Project Health Diagnostics (EPHDSM) powered by Watson
 - Market Dynamics / Spend Analytics (MD/SASM) powered by Watson
- ▶ Deliver value from proposal through execution phases
- ▶ Innovation leading to Strategic Competitive Advantage
 - First of their kind systems in EPC industry
 - Meaningful and actionable business insights
 - Rapidly predict best-in-class pricing globally, project status and outcomes, and improves quality and services
 - Thousands of sophisticated mathematical data analytics models leveraged

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Value

EPHDSM

- Deliver fact based insights and early warning indicators on project performance
- Predict issues such as rising costs or schedule delays based on historical trends and patterns
- Identify the root causes of issues and the potential impacts of changes as input to the decision-making process including estimate analysis, forecast evaluation, project risk assessment and critical path analysis
- Drive more certainty into project schedules and costs for our clients

MD/SASM

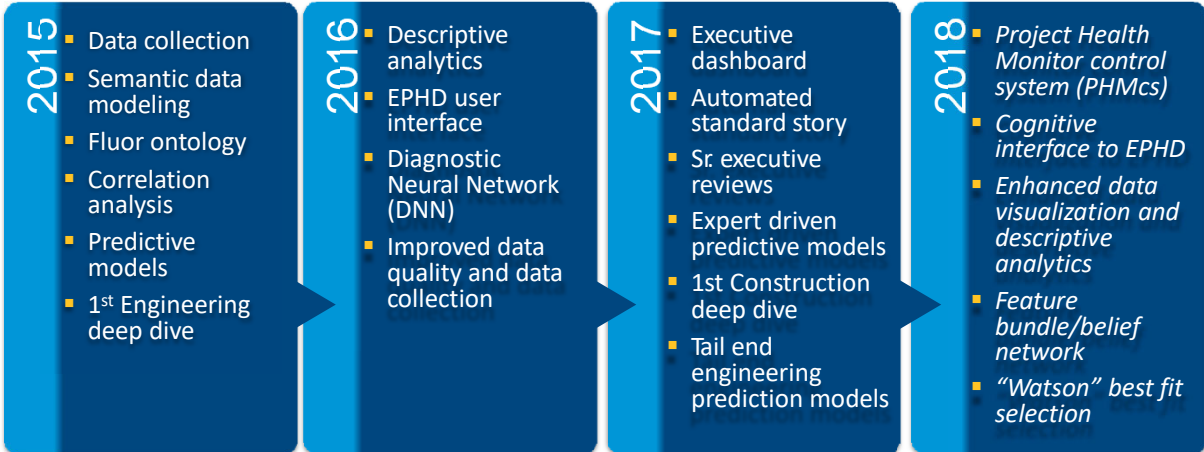
- Leading edge tool providing supply chain insight and precise estimates
- Sourcing and negotiation strategy
- Showcases market trends for key raw materials and potential opportunities and risks for timing of purchases
- Validate and benchmark current pricing trends against data from multiple projects and identify most competitive suppliers globally
- Combines historical and current pricing on materials to predict future prices by incorporating raw materials, currency, and market intelligence
- Incorporates project specific requirements such as sourcing country, suppliers, etc.

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EPHDSM Timeline



Note: *Italicized items are under development*



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EPHDSM Metrics



- ▶ New EPC and EPFC projects being added as engineering starts
 - General criteria:
 - Projects over \$500 million in Total Installed Cost (TIC)
 - E&C, Power and Mining
 - Will expand criteria to include additional business lines and TIC values



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In The Future... “Construction” Continues on EPHDSM

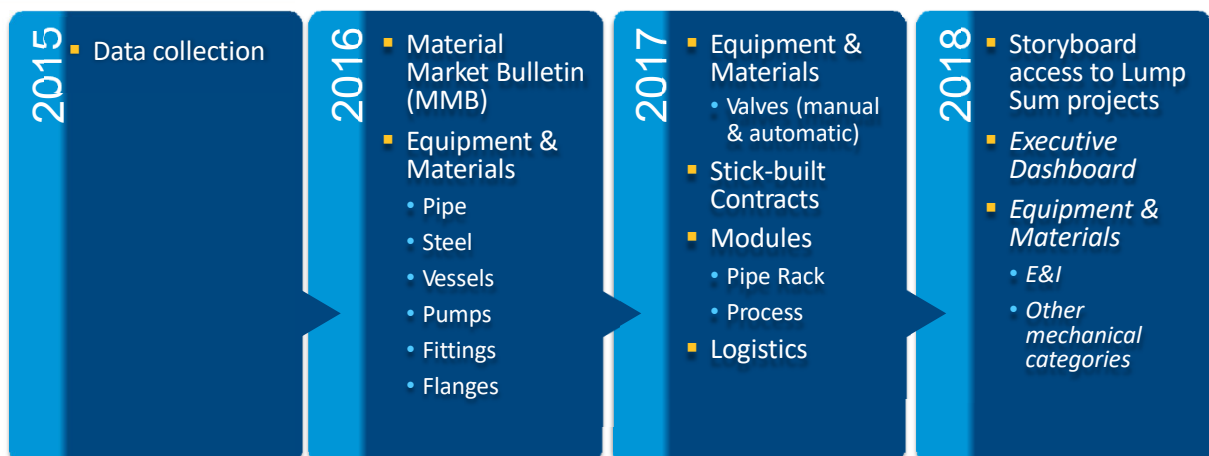
- ▶ Evaluate potential construction execution analytics (CEA) viability – congestion modeling
- ▶ Cost prediction models validation/testing
- ▶ Belief network/feature bundle predictive modeling
- ▶ Multi-modal Cognitive user interface (UI)
- ▶ Continue expansion of descriptive analytics and UI
- ▶ PM Forecast monitor and Hierarchical Prediction Model
- ▶ Higher order “Watson” AI

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MD/SASM Timeline



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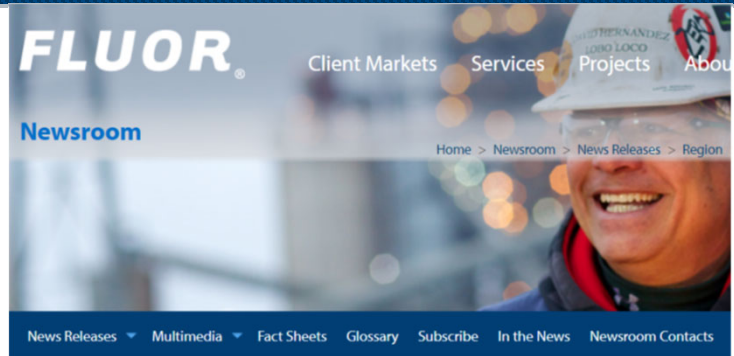
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Other Supply Chain Key Initiatives

- ▶ Digital Transformation
 - Predictive Analytics
 - Field Material Management RFID
 - Source-to-Pay and Supplier Lifecycle Performance
 - Supply Chain Financing
 - Robotic Process Automation
 - Data Standardization
 - Material Visibility



Fluor Uses IBM Watson to Deliver Predictive Analytics Capability for Megaprojects

Fluor drives digital transformation with artificial intelligence solution to monitor status of global projects and drive significant project cost savings

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Transformational Projects

- ▶ **Consulting Transformation Projects**
 - Gemini Consulting
 - Albemarle, Post-IPO, R&D Optimization, Market-Focused and Operations & Maintenance
 - CSC Index
 - OxyChem, Supply Chain and Building a High Performing Team
 - AT Kearney
 - DuPont Textiles & Interiors / Invista Koch Industries, Overhead Cost Reduction
 - Fluor Corporation, Overhead Cost Reduction
 - MW Wheeler and Associates, Inc.
 - El Paso Pipeline, Supply Chain, Overhead and Capital Cost Reduction
 - El Paso E&P, Supply Chain
 - Atlanta Gas Light Resources, Overhead Cost Reduction, Supply Chain
 - Celanese, Logistics Offshoring
- ▶ **Supply Chain Transformations**
 - Reliance Industries Limited, Mumbai, Maharashtra, India
 - Fluor Corporation, Irving, Texas, USA

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John P. Kotter's Eight Steps to Transformation

Dr. John P. Kotter is the Konosuke Matsushita Professor of Leadership, Emeritus, at the Harvard Business School, a New York Times best-selling author, the founder of Kotter International (a management consulting firm based in Seattle and Boston), and a well-known thought leader in the fields of business, leadership, and change.

EIGHT STEPS TO TRANSFORMING YOUR ORGANIZATION

- 1** **Establishing a Sense of Urgency**
 - Examining market and competitive realities
 - Identifying and discussing crises, potential crises, or major opportunities
- 2** **Forming a Powerful Guiding Coalition**
 - Assembling a group with enough power to lead the change effort
 - Encouraging the group to work together as a team
- 3** **Creating a Vision**
 - Creating a vision to help direct the change effort
 - Developing strategies for achieving that vision
- 4** **Communicating the Vision**
 - Using every vehicle possible to communicate the new vision and strategies
 - Teaching new behaviors by the example of the guiding coalition
- 5** **Empowering Others to Act on the Vision**
 - Getting rid of obstacles to change
 - Changing systems or structures that seriously undermine the vision
 - Encouraging risk taking and nontraditional ideas, activities, and actions
- 6** **Planning for and Creating Short-Term Wins**
 - Planning for visible performance improvements
 - Creating those improvements
 - Recognizing and rewarding employees involved in the improvements
- 7** **Consolidating Improvements and Producing Still More Change**
 - Using increased credibility to change systems, structures, and policies that don't fit the vision
 - Hiring, promoting, and developing employees who can implement the vision
 - Reinvigorating the process with new projects, themes, and change agents
- 8** **Institutionalizing New Approaches**
 - Articulating the connections between the new behaviors and corporate success
 - Developing the means to ensure leadership development and succession

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Elements Needed to Deliver a Sustainable Transformation

- ▶ Manage the Transformation Program as a Company Initiative, Not the Consultants Program
- ▶ Win the Hearts and Minds of Middle Management ... Or Implant Some New Managers in Key Areas
- ▶ Reinforce New Behaviors
- ▶ Proactively Answer the Basic Question Every Employee Has In Their Mind ... What's In It For Me?
- ▶ Involvement from the Bottom to the Top of the Organization
- ▶ Make It Simple to Understand

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High Performing Teams

- ▶ Listening
- ▶ Managing a Conversation for Possibilities
- ▶ Managing the Background Conversation
- ▶ Distinguishing Conversations for:
 - Possibility
 - Action
 - Description
- ▶ Coaching
- ▶ Turning Breakdowns into Breakthroughs
- ▶ Recognize and Celebrate Success

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What I Wish Someone Had Shared With Me Early In My Career About Managing Projects

1. Know What You Don't Know and Find Someone on Your Team That Does Know
2. Leadership Is Not Always About Leading, Sometimes You Need to Follow
3. Be Open To New Learnings and Possibilities
4. The Power of Preparation
5. You Can Never Have Too Much Communication
6. Celebrate the Small Wins
7. Balance Being In the Moment with a Focus on Future

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