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How are owners, contractors and suppliers adapting to successfully execute projects and reposition their businesses in the ever evolving project environment? September 7–10, 2011 JW Marriott Desert Ridge, Phoenix, AZ

REPOSITIONING THE PROJECTS BUSINESS IN A WORLD WITH CHANGING BOUNDARIES

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Increased Trends Towards Using Local Resources

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REPOSITIONING THE PROJECTS BUSINESS IN A WORLD WITH CHANGING BOUNDARIES

Market Drivers

- Economic growth in China, India and surrounding emerging markets
- Middle class consumers are increasing their standard of living
 - Higher quality food products and consumer goods
 - Big ticket items: appliances, electronics, automobiles

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- Squeezed manufacturing profit margins
- Formation of Local Economic Blocks/Zones which puts restriction on "Product Import" culture.



Growth of Middle Class Spending

The global middle-class wave

Global middle-class consumption will shift heavily toward China, India, and other Asian countries (excluding Japan) as the high-income countries see their share decrease.



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SOURCE: H. Kharas (2010), 'The Emerging Middle Class in Developing Countries,' OECD Development Centre Working Paper No. 285



Benefits of Manufacturing Locally

Reduced Investment Cost (equipment and other components)

- Reduced Labor Cost (however, "competitive wage" advantage is declining)
- Reduced manufacturing cost
 - Simplified logistics
 - Minimizing customs and import duties
- Improved customer service



Typical Execution Model in the Past

- Front End Engineering and Design (FEED) performed in western countries
- Localization of FEED in-country (time consuming and expensive)

- EPC or EPCM in-country
 - Heavy use of expats for oversight
- Cost prohibitive
- Not sustainable



Current State

- Regional contractors have increased expertise to meet Client needs
 - FEED and EPC/EPCM with minimal western support
- Clients establishing regional operation centers and moving their leadership to the emerging markets
 - Staffing is primarily local with minimal expats
 - Reliance on regional contractors for FEED and EPC/EPCM service
- Local Partnerships between IEC's and CEC's
- International contractors regional offices
 - More skilled local talent with fewer expats
- Clients, regional contractors, and international contractors competing for talent with similar skills



Impact to Contractors

- Local leadership essential for projects of all sizes
- Methods for developing local leaders
 - High potential employees
 - Stretch assignments
 - Boot camps
 - Western assignments for establishing network and training to western standards
- Challenges
 - Achieving low overall efforthour cost (\$/hr)
 - Supporting client project cost and schedule goals without compromising safety and quality
 - Retention
 - Rapid training of locals in best practices, processes, procedures and use of the state of the art technologies to manage projects



Client Staffing Models

- Clients forming long term alliances with multiple contractors
 - Allows clients to have a slim management team
 - Reliance on contractors to provide the best resources for projects
 - Win-win for both parties
- Clients establishing a large operation in developing countries
 - Contractor alliances to provide seconded staff
 - Client self performs projects
 - Busy contractors are reluctant to second employees
 - Requires a large client organization to manage all aspects of EPC/EPCM execution

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Not as cost effective or sustainable



Contractor Execution Strategies (PDP/FEED/Engineering)

- Forming consortiums or partnerships with competitors
 - Sharing of the talent pool
 - Project sizes can dictate partnering to bid and execute projects
 - Not unusual for a large international contractor to become a subcontractor to another international contractor
- Distributed Execution
 - Limited scope (PDP) in western offices
 - Majority of engineering (including FEED) executed in an office located near the client's project site

- Leverages electronic tools and state of the art technologies
- Win-Win for clients and contractors



Execution Strategies for Procurement

- Client and contractors are maximizing local content for engineering/design and material management
 - Use of Industry Standard Specifications instead of expensive Client specifications, in most cases
 - Reduces capital cost and lead time for equipment and materials
 - Early involvement of local suppliers to standardize components
 - Key supplier Strategic Supplier Relationship Agreements (SRAs) to support advancing project schedules
 - Use of local SRAs for standardization supports operations and maintenance of the completed facility



Execution Strategies for Construction

- Client and contractors are maximizing local content for managing construction
 - Use of qualified General Construction Contractor(s), GCC's, who can build from foundations all the way through Mechanical Completion
 - Utilization of a 100% local construction management team (ease of communication and knowledge of local codes and standards and permitting and authority approval requirements)
 - Use of well established construction strategy involving use of multiple GCC's with vertical scope split to minimize interfaces and reduce the CM staff
 - Oversight on all aspects of construction steps including safety, quality, and construction supervision

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Use of Masterpiece program to ensure quality of construction



Execution Strategies for Construction

- Use of a comprehensive Material Responsibility Matrix (MRM)
- Establishment and implementation of a HSE and QA/QC plan
- Use of construction work packages to manage construction effectively from engineering through procurement and through construction
- A well established testing and turnover plan to deliver facility by systems and in accordance with the commissioning and startup sequence

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 Project closeout plan including completion of as-built documentation



Moving into the Future

- World population will reach 10 billion
- Developing countries representing >2/3 of the world's middle class consumption will demand a better standard of living
- China will become world's leader in patents (innovation) and "Created in China" will replace "Made in China"





China Patent Boom





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Moving into the Future (Contd.)

- Manufacturers will move operations in close proximity to consumers
 - Clients establish local operations
 - Contractors establish local EPC/EPCM platform
 - Cost effective execution to support schedule
- Clients and contractors compete for resources in an open market



Successful Mitigation of the Resource

- Alliance and partnering strategies
 - Clients and contractors
 - Competing contractors
 - Create win-win solutions
- Technology
 - Leverage state of the art technologies

- Distributed execution
- Move work not people



- LDK Polysilicon Project: Fast Track, China Execution, \$1.5 Billion TIC; from FEED to first product in 24 months
- Key Execution Strategies
 - Execution Driven by EPCM contractor
 - Slim Client organization
 - Design/Build Approach & Engineering Driven by Construction Sequencing from Day 1

- Use of PEPCI process for material management
- Maximization of onshore equipment and materials
- Use of Teaming Construction Contractors
- Pre-commissioning and Commissioning Support



LDK Google Earth - January 2007







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- Aligned approach to fast track (24month) schedule, without compromising HSE/quality/operational performance and project cost
 - Highly experienced team
 - Use of past experience from a smaller polysilicon project
 - Purchase of all long-lead items during first 30 days
 - Selection of CDI's, CCC's within first 30 days
 - Incorporate strategies to manage
 - Lowest cost
 - Fast track schedule
 - Site mobilization within first 30 days and start of site preparation and underground works

- Development and incorporation of technologies for WWT and Vent Treatment during execution
- Highly instrumented and automated closed loop plant

