2022 Sponsors Only Session

Committee Leads
Willie King, Albermarle
Tony Caletka, PwC

Sub-Committee Members:
Will Kiser, Jonathan Rennie
Caleb Hawkins (FL liaison)

Year: 2022  Date: September 7  Location: San Antonio, Hill Country
Sponsors Only Session – Speaker Overview

Ken Simonson
*Chief Economist*
*Associated General Contractors (AGC)*

Lance Amy
*Global EPC Director*
*Dow*

David Greeson
*Proven Project Development Group*

Jeff Sipes
*Chief Commercial Officer*
*S&B Family of Companies*

Stephen Buras
*Project Director*
*Albemarle*

John Gilmartin
*Process Director*
*Carbon Capture, Fluor*
<table>
<thead>
<tr>
<th>Start</th>
<th>End</th>
<th>Duration</th>
<th>Subject</th>
<th>Facilitator / Speaker</th>
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</thead>
<tbody>
<tr>
<td>1:00 PM</td>
<td>1:10 PM</td>
<td>10 min</td>
<td><strong>Welcome</strong></td>
<td>Jason Kraynek, Willie King, Tony Caletka</td>
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<td>Welcome and SOS Kickoff</td>
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<td>Speaker Introductions and Topic Overview</td>
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<tr>
<td>1:10 PM</td>
<td>1:40 PM</td>
<td>30 min</td>
<td><strong>Industry Trends and Headwinds</strong></td>
<td>Ken Simonson, AGC, Chief Economist, past-Policy Advisor</td>
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<td>Part 1 – The Data</td>
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<td>1:40 PM</td>
<td>1:50 PM</td>
<td>10 min</td>
<td>Q&amp;A</td>
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<tr>
<td>1:50 PM</td>
<td>2:30 PM</td>
<td>40 Min</td>
<td>Industry Trends and Solutions</td>
<td>Panel Discussion - S&amp;B (Jeff Sipes), Dow (Lance Amy),</td>
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<td></td>
<td>Part 2 – Response and Mitigation</td>
<td>Albemarle (Stephen Buras), Moderator, Tony Caletka</td>
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<tr>
<td>2:30 PM</td>
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<td>Q&amp;A</td>
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<td>2:40 PM</td>
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<td><strong>Kick-off - Roundtable Format</strong></td>
<td>Round table-top discussion</td>
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<td>Participant readout</td>
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<td>2:50 PM</td>
<td>3:50 PM</td>
<td>60 min</td>
<td>Industry Trends and Solutions</td>
<td>Facilitators: Past-Future Leaders, Moderator: Quentin</td>
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<td>Part 3 – Facilitated Roundtable Discussion)</td>
<td>Smith</td>
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<tr>
<td>3:50 PM</td>
<td>4:40 PM</td>
<td>50 min</td>
<td><strong>Securing DOE support and funding Carbon Capture projects</strong></td>
<td>Presentation - Proven Project Development Group (David Greeson), Fluor, Process Director Carbon Capture (John Gilmartin)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Q&amp;A</td>
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<tr>
<td>4:40 PM</td>
<td>5:00 PM</td>
<td>10-20 min</td>
<td>Wrap-up</td>
<td>ECC Board</td>
</tr>
</tbody>
</table>
2022 Sponsors Only Session:
U.S. Construction Outlook:
Workforce Worries, Cost Challenges, Project Prospects

Ken Simonson
Chief Economist, AGC of America
ken.simonson@agc.org
Total Nonfarm & Construction Employment, Feb. 2020–July 2022
cumulative change (seasonally adjusted)

Change since Feb. 2020:

- Residential Construction: +194,300 (6.5%)
- Total Nonfarm: +32,000 (0.02%)
- Nonresidential Construction: -112,000 (-2.4%)

Source: BLS current employment statistics, https://www.bls.gov/ces/
Construction job openings & new hires

Job openings and hires, June 2001-June 2022, not seasonally adjusted

New hires Jun 2022: 412,000
change from Jun 2021: -2.8%

Job openings Jun 2022: 330,000
change from Jun 2021: 2.5%

Rate of construction unemployment
July 2000–July 2022, not seasonally adjusted

July 2022 3.5%

Sources: Unemployment from BLS www.bls.gov/cps
State construction employment change, Feb. 2020–June 2022

31 states up, 1 flat, 18 states and DC down (U.S.: 0.7%)

Top 5
Utah 14.1%
Idaho 12.9%
Tennessee 12.0%
South Dakota 10.8%
New Hampshire 9.8%

Bottom 5
New York -8.9%
North Dakota -6.4%
Hawaii -5.8%
Kentucky -5.5%
New Jersey -5.4%
Costs vs. bid prices for new nonresidential construction
Year-over-year change in PPIs, Sep 2020–Jul 2022, not seasonally adjusted

12 months to:
<table>
<thead>
<tr>
<th></th>
<th>Sep 2020</th>
<th>Jul 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPI: Bid price</td>
<td>1.8%</td>
<td>23.9%</td>
</tr>
<tr>
<td>PPI: Inputs</td>
<td>1.8%</td>
<td>14.6%</td>
</tr>
</tbody>
</table>


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PPIs for construction bid prices and selected inputs
cumulative change in PPIs, April 2020-July 2022 (not seasonally adjusted)

% change
April 2020 - Jul 2022:

- Steel mill products: 116%
- Lumber and plywood: 60%
- Plastic construction products: 56%
- Copper & brass mill shapes: 52%
- Gypsum building materials: 44%
- Aluminum mill shapes: 44%
- Truck transportation: 39%
- ‘Bid price’ (new non-res building construction): 30%

Cost squeeze on contractors can last two years or more

Difference between year-over-year change in materials costs vs. bid prices, Jan 2007-July 2022

Source: Bureau of Labor Statistics, www.bls.gov/ppi, producer price indexes PPI nonresidential (material costs) and new school building (bid prices)
Change in construction spending: June 2022 vs. June 2021

current (not inflation-adjusted) dollars, seasonally adjusted

Total 8%; private residential 16% (single-family 8%; multi -0.1%); private nonres 2%; public -0.4%

Largest segments (in descending order of June 2022 spending)

• Power -12% (electric -15%; oil/gas fields & pipelines -4%)
• Commercial 10% (warehouse 14%; retail 6%; farm 11%)
• Highway and street -1%
• Education -1% (primary/secondary -9%; higher ed 8%)
• Mfg. 34% (chemical -9%; computer/electronic 149%; food/beverage/tobacco 5%; transp. equip. -25%)
• Office -1%
• Transportation -4% (air -14%; freight rail/trucking 5%; mass transit 2%)
• Health care 4% (hospital 6%; medical building 7%; special care -13%)
• Lodging -7%
## Forward-looking indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Latest date</th>
<th>Current value</th>
<th>Year-ago value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture Billings Index (ABI)</td>
<td>June</td>
<td>53.2</td>
<td>57.7</td>
</tr>
<tr>
<td>Dodge Momentum Index (DMI)</td>
<td>July</td>
<td>179</td>
<td>159</td>
</tr>
<tr>
<td>Multifamily permits not yet started</td>
<td>July</td>
<td>147,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

Source: American Institute of Architects (ABI), Dodge Data & Analytics (DMI), Census Bureau (New Residential Construction)
Medium-term impacts as recovery begins

- Economic recovery should continue but invasion of Ukraine and Western sanctions add to cost and supply-chain pressures.
- Slower rebound than for other sectors as owners, investors/lenders, institutions, and public agencies face uncertainty about future demand, costs, and completion times.
- Continuing cost and supply challenges may lead to more project deferrals.
- Infrastructure funds will take time to distribute and award to individual projects, muting the medium-term impact on labor and materials “shortages.”
- Best current prospects: manufacturing, data centers, renewable energy.
- At risk of slowdown: warehouse, multifamily.

Source: Author
• Finding workers will be a challenge for much longer than materials costs or supply
• Slower population growth means slower demand growth for most construction
• Slowing demand for K-12, decline for higher ed construction
• Permanent shift from retail to e-commerce/distribution structures
• More specialized and online healthcare facilities; fewer hospitals, nursing homes
• More wind, solar, battery storage and charging facilities, and related manufacturing
• Not clear if offices will decentralize or remain in less demand
• Not clear if recent urban/rural or state-to-state migration will remain or reverse

Long-run construction outlook (post-pandemic)

Source: Author
Population change by state, July 2020–July 2021 (U.S.: 0.12%)
AGC economic resources
(email ken.simonson@agc.org)

- The Data DIGest: weekly 1-page email (subscribe at http://store.agc.org)
- ConsensusDocs Price Escalation Resource Center: https://www.consensusdocs.org/price-escalation-clause/
- Surveys, state and metro data, fact sheets: www.agc.org/learn/construction-data
- Monthly press releases: construction spending; producer price indexes; national, state, metro employment with rankings: https://www.agc.org/newsroom
2022 Sponsors Only Session: Industry Trends and Solutions Part 2 – Response and Mitigation

Panelists:
- Stephen Buras, Albemarle
- Lance Amy, DOW
- Jeff Sipes, S&B

Moderator:
- Tony Caletka, PwC

Year: 2022  Date: Sep 7  Location: San Antonio
Sponsors Only Session – Speaker Overview

Jeff Sipes
Chief Commercial Officer
S&B Family of Companies

Stephen Buras
Project Director
Albemarle

Lance Amy
Global EPC Director
Dow
Responding to Inflation and Uncertainty

Stephen Buras
Project Director
Albemarle
Supply Chain and Workforce Solutions

Lance Amy
Global EPC Director
Dow
Managing What We Can Control

Jeff Sipes
Chief Commercial Officer
S&B Family of Companies
2022 Sponsors Only Session:
Industry Trends and Solutions
Part 3 – Facilitated Roundtable Discussion

Table Facilitators:
Past-Future Leaders

Moderator
Quentin Smith

Year: 2022
Date: Sep 7
Location: San Antonio
Questions – How are these factors impacting your portfolio, and how are you mitigating them?

1. Supply chain, equipment & materials shortages, lead time and logistic challenges

2. Labor availability and skills shortages, while attempting to retain and recruit employees

3. Ability to manage pipeline and margin uncertainty, given inflation and transition of funding priorities towards cleaner and renewable energy
How are these factors impacting your portfolio, and how are you mitigating them?

1. Supply chain, equipment & materials shortages, lead time and logistic challenges
How are these factors impacting your portfolio, and how are you mitigating them?

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2022 Sponsors Only Session
Advancing Carbon Capture Projects with DOE Funding Support

**Presenters:**
John Gilmartin, Process Director, Carbon Capture, Fluor
David Greeson, Proven Project Development Group

**Moderator**
Willie King, Albemarle

**Year:** 2022  
**Date:** Sep 7  
**Location:** San Antonio
2022 Sponsors Only Session
Advancing Carbon Capture Projects with DOE Funding Support

John Gilmartin
Process Director
Carbon Capture, Fluor

David Greeson
Proven Project
Development Group
Introduction – Path to Net Zero by 2050

U.S. goal of Netzero by 2050 is a monumental task

- The path will require several components including:
  - Increased energy efficiency
  - Switch to Hydrogen & Low carbon fuels
  - Decarbonization of electricity

U.S. carbon emissions reduction targets are part of the solution:

- 50% reduction from 2005 levels by 2030
- Carbon-pollution-free power sector by 2035

Carbon capture technologies will play an integral role to be able to meet targets

Source: whitehouse.gov
Introduction – How the Government is helping

The Federal Government is supporting carbon capture through tax credits

- In 2018, passed 45Q to incentivize carbon capture implementation
- Recently passed Inflation Reduction Act (IRA) increases incentives from the original 45Q

The DOE is investing billions of dollars to help meet carbon capture targets

- How the DOE offers support through its offices
- How to secure DOE funding for your carbon capture project?
- What are the opportunities / challenges associated with receiving DOE funding support?
Furthering Carbon Capture, Utilization, Technology, Underground storage, and Reduced Emissions Act (FUTURE Act) or 45Q is a part of the Bipartisan Budget Act of 2018

45Q provides a performance-based tax credit to power plants and industrial facilities that capture, use, or store CO$_2$ that would otherwise be emitted into the atmosphere.

The captured CO$_2$ could be utilized (i.e. for EOR or as a feedstock) or sequestered deep in saline geologic formations.

Tax credits go to the entity capturing, using or storing CO$_2$.

- Tax credits can be transferred from the entity capturing CO$_2$ to the entity using it.

Eligible projects should begin construction before January 1, 2026 (since updated in the IRA).

Projects can claim credit for up to 12 years after the carbon capture plant is placed in service.
### 45Q Original Credit Specifics

#### Level of credit available for different combinations of CO₂ sources and uses

**IEA Analysis**

<table>
<thead>
<tr>
<th>Type of CO₂ storage/use</th>
<th>Minimum size of eligible carbon capture plant by type (ktCO₂/yr)</th>
<th>Relevant level of tax credit in a given operational year (USD/ktCO₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power plant</td>
<td>Other industrial facility</td>
</tr>
<tr>
<td>Dedicated geological storage</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>Storage via EOR</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>Other utilisation processes</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

¹ each CO₂ source cannot be greater than 500 ktCO₂/yr  
² Any credit will only apply to the portion of the converted CO₂ that can be shown to reduce overall emissions
Inflation Reduction Act Highlighted Impacts on 45Q

Bill extends deadline for starting construction until 2032 for eligibility of credits

Relaxes minimum annual carbon capture requirement:
- Electric generating facilities: 500,000 metric tons reduced to 18,750 metric tons with 75% total carbon emissions captured
- Direct air capture: 100,000 metric tons reduced to 1,000 metric tons
- All other facilities reduced to 12,500 metric tons

Includes changes that could make monetizing the 45Q credits easier (could expand investor marketplace)
Includes domestic content requirements for iron, steel, or other manufactured products

Tax credit increases

<table>
<thead>
<tr>
<th></th>
<th>Original 2018 BBA 45Q Credit</th>
<th>2022 IRA 45Q Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Facility with CO₂ Utilization</td>
<td>Up to $35 per metric ton</td>
<td>Up to $60 per metric ton</td>
</tr>
<tr>
<td>Industrial Facility without CO₂ Utilization</td>
<td>Up to $50 per metric ton</td>
<td>Up to $85 per metric ton</td>
</tr>
<tr>
<td>Direct Air Capture with CO₂ Utilization</td>
<td>Up to $35 per metric ton</td>
<td>Up to $130 per metric ton</td>
</tr>
<tr>
<td>Direct Air Capture without CO₂ Utilization</td>
<td>Up to $50 per metric ton</td>
<td>Up to $180 per metric ton</td>
</tr>
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</table>
Bipartisan Infrastructure Law (BIL)

BIL (Infrastructure Investment and Jobs Act) passed in November 2021
- Nearly $550 billion in total new infrastructure spending
- $65 billion investment includes funds to new programs to “support the development, demonstration, and deployment of cutting-edge clean energy technologies to accelerate our transition to a zero-emission economy” *Source: whitehouse.gov*
- Associated funding opportunities expected to be announced in very near future
DOE’s Goal and Organizational Structure

Spearheading the US’s role to deliver a clean energy future

In February 2022, a shift in the organizational structure of the DOE was made to better support and fund private industry.

Source: Climate Tech VC ctvc.co
DOE Support across the Value Chain

**National Labs** – 17 national labs responsible for breakthrough climate technologies

**Office of Science** – supporter of basic research for theoretical physicists and nuclear scientists

**Office of Energy Efficiency and Renewable Energy** – tasked with equitably transitioning the US to net zero by 2050. Five key decarbonization priority areas: 1) electricity 2) transportation 3) energy-intensive industries 4) buildings 5) agriculture

**Fossil Energy and Carbon Management** – offers support to climate technologies reducing emissions from fossil fuel production, removing atmospheric CO$_2$, and durably converting/storing CO$_2$

**ARPA-E** – innovation focused climate program seeking to accelerate and de-risk early TRL game-changing energy technologies

**Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR)** – provide grants sponsored by a federal agency to expand R&D and innovation

**Office of Technology Transitions** – assists DOE-developed technologies through the value chain collaborating with private sector to ensure technology de-risking

**Office of Clean Energy Demonstrations** – supports demonstration projects across clean hydrogen, carbon capture, nuclear reactors, energy storage, and grid updates

**Loan Programs Office** – offers loans to scale fully to commercial-level deployment
How the DOE releases information about funding

**Request for Information (RFI)** – an RFI will be issued as an open call for key industry stakeholders and the general public to engage with them on key priority areas

– An RFI is often a strong signal that a funding opportunity will soon follow

**Notice of Intent (NOI)** – the DOE may release a NOI to “pre-announce” and establish a date for when the funding opportunity will be issued

– Examples: Regional DAC hubs (Q4 2022), CCS Demonstration Projects (Q4 2022)

**Funding Opportunity Announcement (FOA)** – the formal opening of a funding opportunity
DOE’s Office of Fossil Energy and Carbon Management (FECM) issues competitive FOA solicitations

List of FOAs or NOIs can be found at: https://www.netl.doe.gov/business/solicitations
NETL Websites

FedConnect
https://www.fedconnect.net/FedConnect/Default.htm

Grants.gov
https://www.grants.gov/

EERE Program Information Center
https://epicweb.ee.doe.gov/EPICWeb/#/home

Contract Opportunities
https://sam.gov/content/home

Solicitations, FOAs and amendments, receiving proposals and applications, and disseminating award information
Must register at these websites to participate
Proposals accepted only through website indicated in the solicitation document
Completing an FOA Application

Numerous steps in the application process
- Can take several months from start to finish
- Deadlines listed on the cover page of the FOA

Applicants must submit detailed information on:
- Technology being considered
- Relevant experience of Project sponsor
- How project will be delivered in a commercially successful manner
- How will project support other Administration priorities
  - e.g. social justice initiatives
Keys to Filling Out DOE FOA Applications

Must follow stringent guidelines and formatting rules
  – Typically limited to around 35 pages
Identify all prime and sub-recipients of funding
Be convincing on competency to execute the project outlining key details while providing a sales punch
  – What differentiates your project from others?
  – DOE sees numerous applications and tends to favor new and novel concepts
    • Leads to funding of many technologies with low TRLs
Keys to Filling Out DOE FOA Applications

Be clear on what information will be provided with reports to DOE at the end

- Limited rights data – information can be shared with DOE, but will not be provided
- Protected rights data – information will be provided to DOE under confidentiality and will not be disclosed to public over confidentiality term
- Unlimited rights data – information that DOE can share in public report
Funding Agreements

Successful applicants will be invited to negotiate a cooperative agreement

- Agreement on timing for receipt of funding and conditions of funding
- Funding recipients are typically required to contribute a percentage of cost share
- Requires awardees to meet milestones throughout the project to continue receiving funding
- DOE requires specific accounting practices for use of the funds
Writing Reports for DOE

**Public Final Report**
- Contains only non-confidential information for public consumption
  - Where it is practical, modify some key confidential deliverables to make non-confidential
  - No redactions
- Executive summary should highlight key unique findings on the project
- Needs to be very descriptive around each drawing / deliverable

**Confidential Final Report**
- Contains unlimited and protected rights data, but not limited rights data
- Deliverables with limited rights data can be redacted where practical to suit final report
Keys to being selected

Excellence
– Follow the rules to a “T” – DOE has been doing this for a long time and wrote the rules for a reason – not to just see if you can follow instructions
– Clear and concise language – they don’t care if you think your project is wonderful, they want the facts so they can come to that conclusion
– English and grammar matter – suggest lead editor be a native English speaker
– Make sure the math adds up - Nothing unsettles a reviewer more than a math error

Preparation
– For the past 10 years DOE has used a very standard format for FOAs – because they have done this so much, they know what works
– Use prior solicitations to prepare draft application – then you only need to adapt rather than create when FOA is issued
– Make your first submittal at least 3 days before the deadline – the site can go down and DOE does not consider that an excuse. If you need to amend, DOE typically will only accept the LAST version of your application submitted
Successful Project Execution with DOE

Treat DOE as an Investor – which they are

Invite them to all technical and commercial meetings – share everything provided to non-government investors and lenders

Submit complete reports on time – hitting DOE’s deadlines with quality reporting is key to maintaining relationship

Work with DOE on issues/problems – DOE has probably dealt with a version of your problem before

Flexibility – do not underestimate DOE’s flexibility and their tool chest available to handle problems

– They want you to succeed more than you do

– Demonstration projects by their nature lay bare issues with commercial deployment of a technology – DOE is prepared to help with project modifications or changes to the execution plan in order to achieve Congressional objectives
Petra Nova Case-Study

$600 million CCS demonstration
$190 million DOE Demonstration Grant
6 years of planning and study prior to NTP
On-time and on-budget
Cooperative Agreement amended many times
Almost all related to schedule leading up to NTP
2022 Sponsors Only Session

Thank you

Committee Leads
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Tony Caletka, PwC

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Will Kiser, Jonathan Rennie
Caleb Hawkins (FL liaison)

Speakers:
Ken Simonson, AGC
Lance Amy, Dow
Stephen Buras, Albemarle
Jeff Sipes, S&B
John Gilmartin, Fluor
David Greeson, PPDG

Theme: ECC SOS Session

Year: 2022
Date: September 7
Location: San Antonio, Hill Country
Appendix
Securing DOE support and funding Carbon Capture projects

Background:
John P. Gilmartin is a Process Engineering Director at Fluor with more than 21 years of gas treating experience, specifically as it related to carbon capture. A significant portion of John’s time at Fluor has focused on advancing the Econamine FG PlusSM (EFG+) technology for post-combustion carbon capture. He holds one patent for an EFG+ split flow configuration and is recognized as a Fluor CO₂ capture SME.

Background:
David Greeson is a consultant to the carbon capture and power generation industries. Until his retirement in 2018, David was the Vice President of Development for NRG Energy where he led NRG’s Gulf Coast business development group and the company’s carbon capture program. David was the developer of the $1 billion Petra Nova project near Houston, TX from inception through commissioning and is now consulting with companies planning development of CO₂ capture projects. He began his career in the power industry 42 years ago at Houston Lighting & Power. Over the years, he has developed five major power projects here in the US which represent over $3 billion of investment.

Key takeaways:
Carbon Capture Projects

Funding Opportunities: U.S. Federal government is investing billions of dollars to achieve NetZero by 2050 through development and deployment of clean energy technologies and massive tax credits for projects successful in capturing CO₂.

Securing Support: Attainable by diligently filling out FOA applications that are clear, concise, and sell the novel parts of your project.

Carbon Capture Trends: Since passage of original 45Q Future Act in 2018 along with 2022 IRA enhancements and BIL funding, the number of carbon capture prospects are rapidly expanding.

Taking it Further:
john.gilmartin@fluor.com, (949)349-3331
david@davidgreeson.com, (281)220-7623
Managing pipeline uncertainty given inflation and transition of funding priorities on clean and renewable energy?

Roundtable Session 1

Industry Trends and Headwinds

Practical solutions to respond to Industry Trends and Headwinds – Ken Simonson Takeaways

Speakers / Panel

Ken Simonson  
Chief Economist  
Associated General Contractors (AGC)

Jeff Sipes  
Chief Commercial Officer  
S&B Family of Companies

Stephen Buras  
Project Director  
Albermarie

Lance Amy  
Global EPC Director  
Dow

Tony Caletka  
Moderator  
Partner, PWC

Summary

Owners and contractors are mitigating recent industry ‘headwinds’, including inflation, supply chain, finance and labor challenges, by managing what they can control and staying focused on project economics and strong project delivery. Simonson identified four developments affecting the near-to-medium E&C outlook:

- Inflation & rising interest rates are slowing the economy, especially including housing and "commercial" construction
- Manufacturing, power/energy & infrastructure construction are much less vulnerable
- Supply-chain shocks & sudden cost swings add to uncertainty about project timing, contractor finances
- But worker shortages and inexperience are the #1 concern for many contractors

Key Takeaways – From Ken Simonson

Mitigating supply chain / material shortages, lead-time and logistic challenges

Notable themes:
- Earlier ordering cuts price & lead-time uncertainty but requires earlier spec-ing, payment, issues with storage, insurance, risk of damage, theft, mis-ordering
- Price adjustment clauses worth exploring but can be complicated
- Frequent communication & decision-making are vital

Reducing impact of labor availability and skills while enhancing ability to recruit and retain employees

Notable themes:
- Contractors will need to raise pay, offer higher per diems, and more overtime to be competitive and offset shortfall of experienced workers
- Expect more offsite fabrication, onsite use of advanced tools, software
- Employer-sponsored immigration would help but relief appears unlikely

Managing pipeline uncertainty given inflation and transition of funding priorities on clean and renewable energy?

Notable themes:
- Will require greater engagement with schools & workforce agencies
- Need to make jobsites more welcoming to diverse sources of workers
- Need to offer feedback, encouragement & recognition without micromanaging
Managing pipeline uncertainty given inflation and transition of funding priorities on clean and renewable energy?

Contractors can expect worker shortages, skills gap to outlast materials-cost & supply-chain woes

Notable mitigations:
- Basic blocking and tackling drives project predictability.
- Improve estimates and schedules developed in FEL2 so that key cost and schedule decisions can be made well before FID.
- Prioritize projects based on ROI/IRR, and surety of outcome.
- Improve demand planning across multiple projects to avoid ‘just in time’ delivery (stockpile high demand bulk materials and long lead equipment)

Notable mitigations:
- Pandemic worsened worker shortfall as other sectors raise pay, benefits, offer flexible hours and working locations
- Align recruiting with expected portfolio growth and forecast demand
- Minimize availability risks by partnering with EPC’s that can hire into the workload and work share on Sustaining and Growth Cap-Ex
- Apply CII best practices around owner and contractor alignment as critical factor to project performance.
- Execute the project expeditiously without recycling execution strategy decisions already made

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