



# Texas Clean Energy Project Project Update

*2012 CO2 Workshop*

*Midland, TX*

*December 2012*

# Summit Power Overview

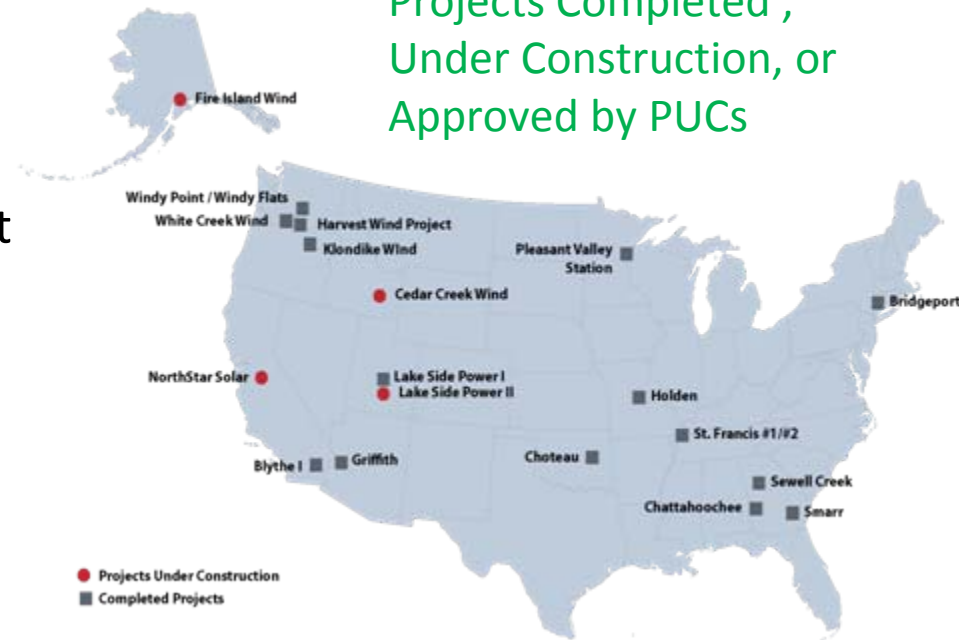


- Summit Power Group is a Seattle-based developer of clean energy projects
- Founded 21 years ago by former U.S. Secretary of Energy Don Hodel & COO of Department of Energy Earl Gjelde

- Summit's projects:
  - Over 7,000 MW completed
  - Over 2,000 MW in development

- Summit's principal project types:
  - Wind power
  - Solar power
  - Natural gas-fired power plants
  - Carbon capture projects

Projects Completed ,  
Under Construction, or  
Approved by PUCs



# Texas Clean Energy Project - PolyGen



PRB Coal via Railroad



Coal  
1.8mm tpy

Brackish Water  
Purified via Reverse  
Osmosis



Water

Air Separation Unit



Oxygen

Coal Gasification and  
Gas Cleanup



Coal, Steam and  
Oxygen Input. Main  
Outputs are Syngas  
(Hydrogen and Carbon  
Monoxide) and Pure  
CO<sub>2</sub>

2/3 of  
Syngas

1/3 of  
Syngas

1/6 of  
CO<sub>2</sub>

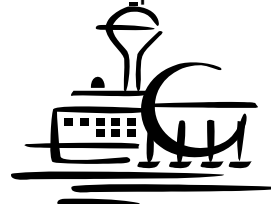
5/6 of  
CO<sub>2</sub>

High Hydrogen Power  
Turbine



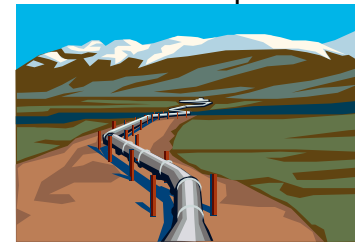
195 MW low  
carbon power  
delivered to City  
of San Antonio

Ammonia / Urea  
Complex



710,000 tons/yr  
delivered to  
CHS Inc.

CO<sub>2</sub> Delivered to Oil  
Fields via Pipeline



2.5mm tons per  
year delivered  
to Oil  
Companies

# Diversified Revenue Stream



## Bankable Offtake Contracts

### Power

- 400 MW gross output
- 195 MW net to grid
- ERCOT peak demand 68,379 MWs

### CO<sub>2</sub>

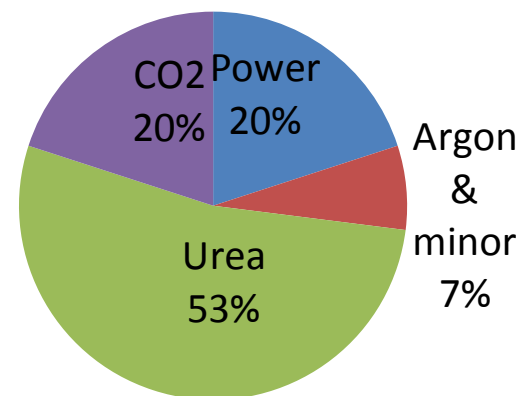
- 2.5 M tons/year
- 90% capture rate
- 37 M tons annual new demand

### Urea

- 710k tons/year
- US demand 10 M tons/year
- US imports 7 M tons/year

## Revenue

30 year, PV10



# TCEP Status

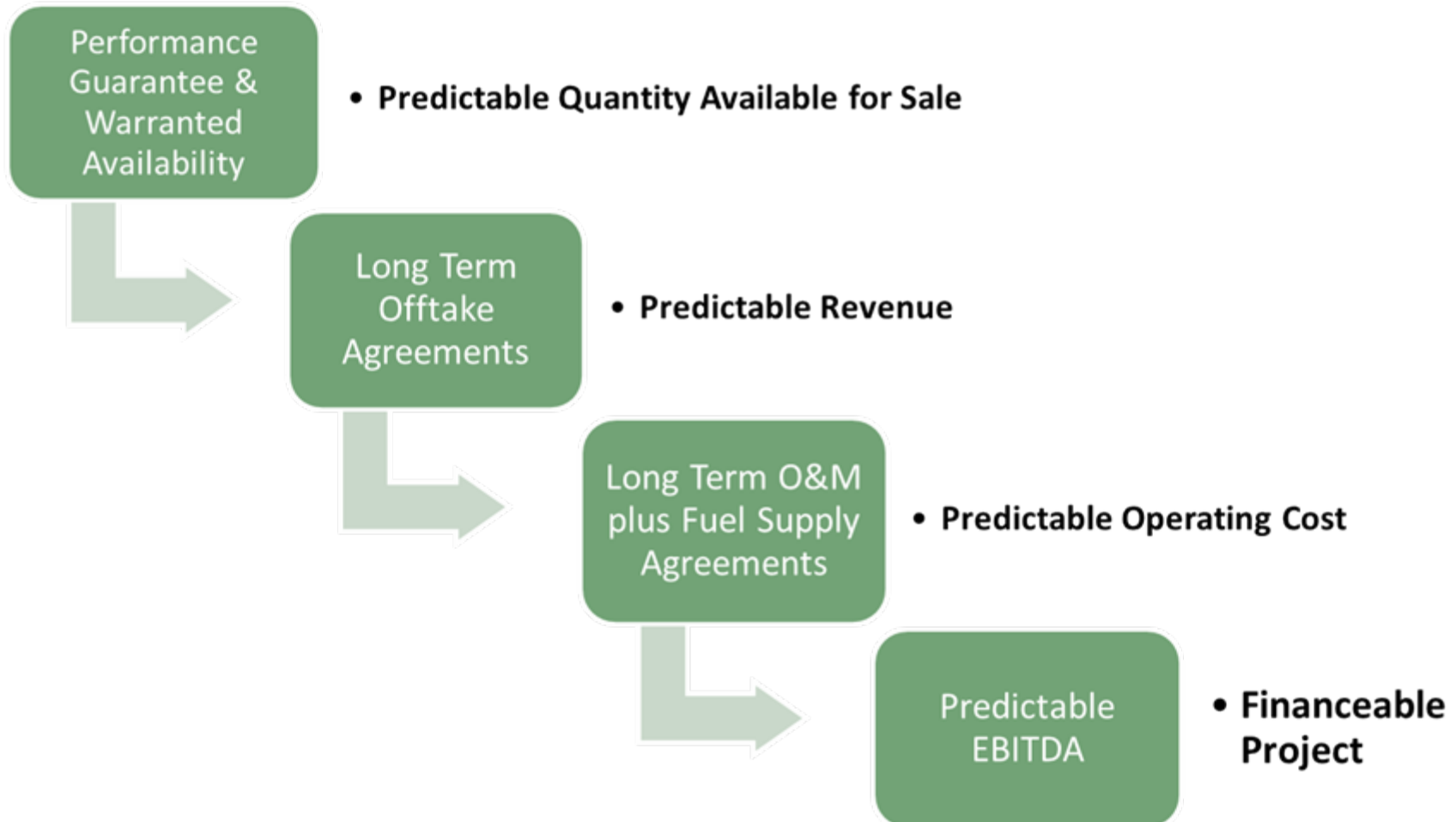
## Dec 2011



- **Site acquired** ✓
- **Permitting** ✓
  - Record of Decision from US DOE on 9/29/10 (completes NEPA / EIS process)
  - Air permit issued 12/28/10 (no greenhouse gas emissions limits)
- **FEED study** ✓
- **Water rights** ✓
- **Offtake agreements** ✓
  - 100% of power sold to CPS Energy for 25 years
  - 100% of CO<sub>2</sub> sold for 30 years (three different buyers; market very strong)
  - 100% of urea sold to CHS (Blue Chip Fertilizer / chemical company)
- **Engineering, Procurement & Construction contracts** ✓
  - Siemens, Linde, and SK E&C as the EPC contractors
  - Lump-sum, fixed-price, turnkey EPC contracts
- **O&M agreement** ✓
  - Provides 15-year warranties for project performance
  - Joint venture full plant operations by Linde and Siemens

# Combining Warranties & Agreements

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POWER



# Project Financing Lessons



- Application of IPP experience to Project financing of TCEP
- New industry – did not cleanly fit anyone’s investment portfolio
- Construction time period difficult to manage
- Tax incentives difficult to monetize – grants are better



# Strategic Shift in Financing



- Executed MOU with Sinopec Engineering Group for Chemical Block EPC
- Gateway for China EXIM to provide 100% of long term project debt
- Chinese equity limited to less than 50%
- CFIUS filing required

## Conclusion:

TCEP is a complicated project = Complicated projects take time

Chinese participants > complication = Additional time required



# Additional Projects in Permian

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Power to  
CPS Energy, Inc.

Urea to  
CHS, Inc.

Texas Clean Energy  
Project (TCEP)

Syngas for other  
petrochemical products:

- Ethylene?
- Methanol?
- Plastics?
- Diesel?
- Ammonia?
- Urea?

TCEP #2 (XCEP)

TCEP #3 (YCEP)

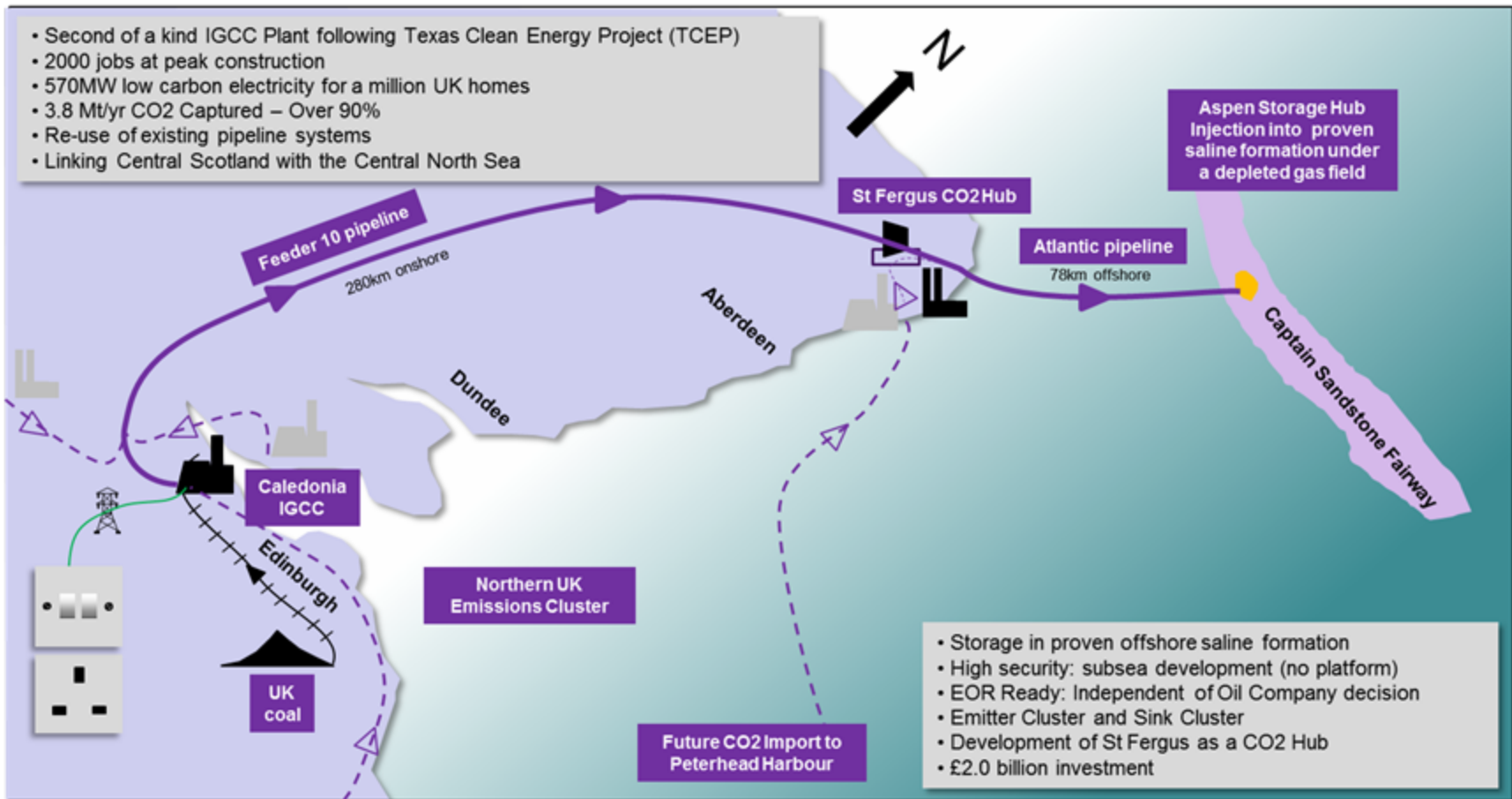


CO2 sold for EOR  
Operations in the  
Permian Basin

# Captain Clean Energy Project



Minimizing the cost of CO2 abatement via Clean Power and CO2 storage



# Captain Clean Energy Project



## Right Business model in TCEP being rolled out in the UK

- Second of a kind IGCC development
- Well appraised Central North Sea aquifer storage site
- Re-use of onshore and offshore pipeline infrastructure
- 3.8Mt/yr CO2 will be abated and safely stored
- Delivery through experienced and highly motivated organizations
- Project is :
  - **Deliverable, Affordable and provides Optionality**



**SIEMENS**

**nationalgrid**  
THE POWER OF ACTION

# Contact Information



- Ann Banks:
  - [abanks@summitpower.com](mailto:abanks@summitpower.com)
  - (713) 205-0755
- See also:
  - [www.summitpower.com](http://www.summitpower.com)
  - [www.texascleanenergyproject.com](http://www.texascleanenergyproject.com)