Private Activity Bonds to Spur CCS Commercialization

Jeff Brown

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Two Subjects Today

- Multiple incentives needed to make CCS a reality today—later panel discussing that.

- Tax-exempt debt (Private Activity Bonds, or PABs) for carbon capture is the newest incentive under discussion and can be a big help.

Where We Are Now on Economics

- Adding CCS to a power plant requires revenues of about **\$50-\$60** per short ton CO2 captured
- That is, to break even, including cost of debt and equity, on a standalone business basis.
- At current CO2 prices (~\$1.25/MCf or **\$20/ston**) you're short by **\$30-40/ston**.
- If you are economically integrated with a power plant or CO2-EOR operation, they may boost you a bit, but you are still very short.

If the Current State of the World Doesn't Work → Need Incentives

<u>Incentives that Raise Annual Cash Inflows</u>

- Stabilization: hedges or floors on oil price embedded in CO_2 sales
- Extended 45Q
- Bankable CO_2 allowances derived from CPP

<u>Incentives that Reduce Annual Cash Outflows</u>

- ITCs or Grants to reduce initial capital cost
- **<u>Tax-exempt debt</u>**
- Full MLP eligibility

What’s Wrong With Debt Markets

A CCS project needs:

- Long-term debt (long-lived assets, added on to facilities in ultra-competitive markets like power)
- Investor tolerance of sub-investment grade ratings (virtually impossible to get investment grade, esp. w/ oil price risk embedded in CO2 prices)
- Fixed-rate debt (enough risk without rate spikes)
- Significant debt: capital (equity very expensive, leverage reduces average cost of capital)
- Investor tolerance for some technology risk and certainly “greenfield” construction risk
- Investor appetite for “single asset” project risk
- Tax-exempt project market in Private Activity Bonds does all of these.

CCS Can’t Get What it Needs

Market	Long-Term Available	Not Invest-ment Grade OK	Fixed Rate Available	Construc-tion Risk OK	Project Risk OK
144(a) Bonds		✗			
Insurance Placement		✗			
Bank Term Loan	✗		✗		
Foreign EXIM Banks	✗		✗	?	
High Yield Bonds	✗			✗	✗
Term Loan “B” Debt	✗		✗	✗	✗
Tax-Exempt PAB	✓	✓	✓	✓	✓

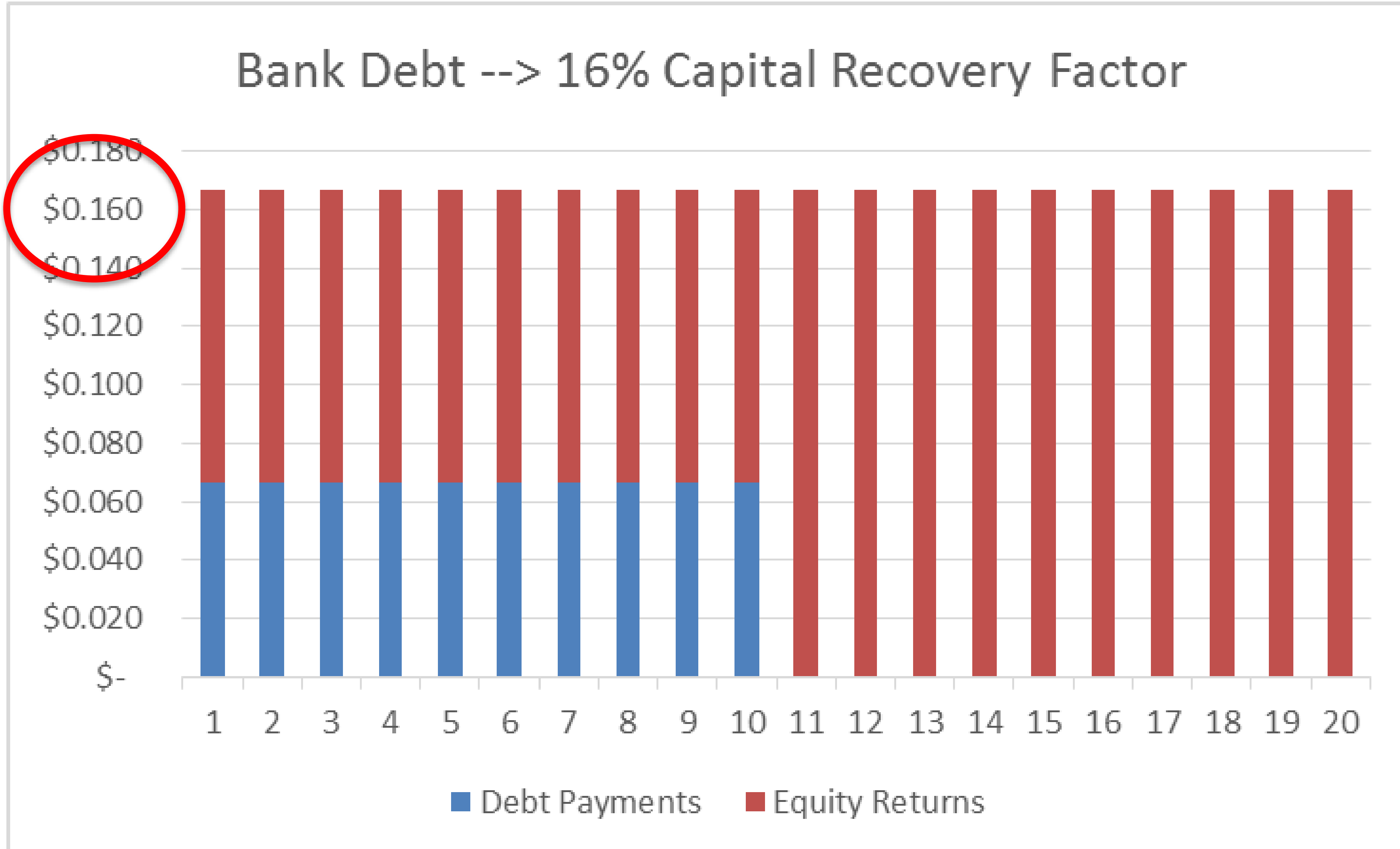
What's So Good About PABs

- PABs are basically held by individuals and proxies for individuals (bond funds)
- No Federal Reserve or National Association of Insurance Commissioners to regulate
- No bond fund is a Systemically Important Financial Institution
- Pretty much all muni bond market does is finance greenfield projects, often with strange new features, frequently for private companies
- The tax-exempt bond market will look at deals on their own merits and make a rational business decision—just what CCS projects need

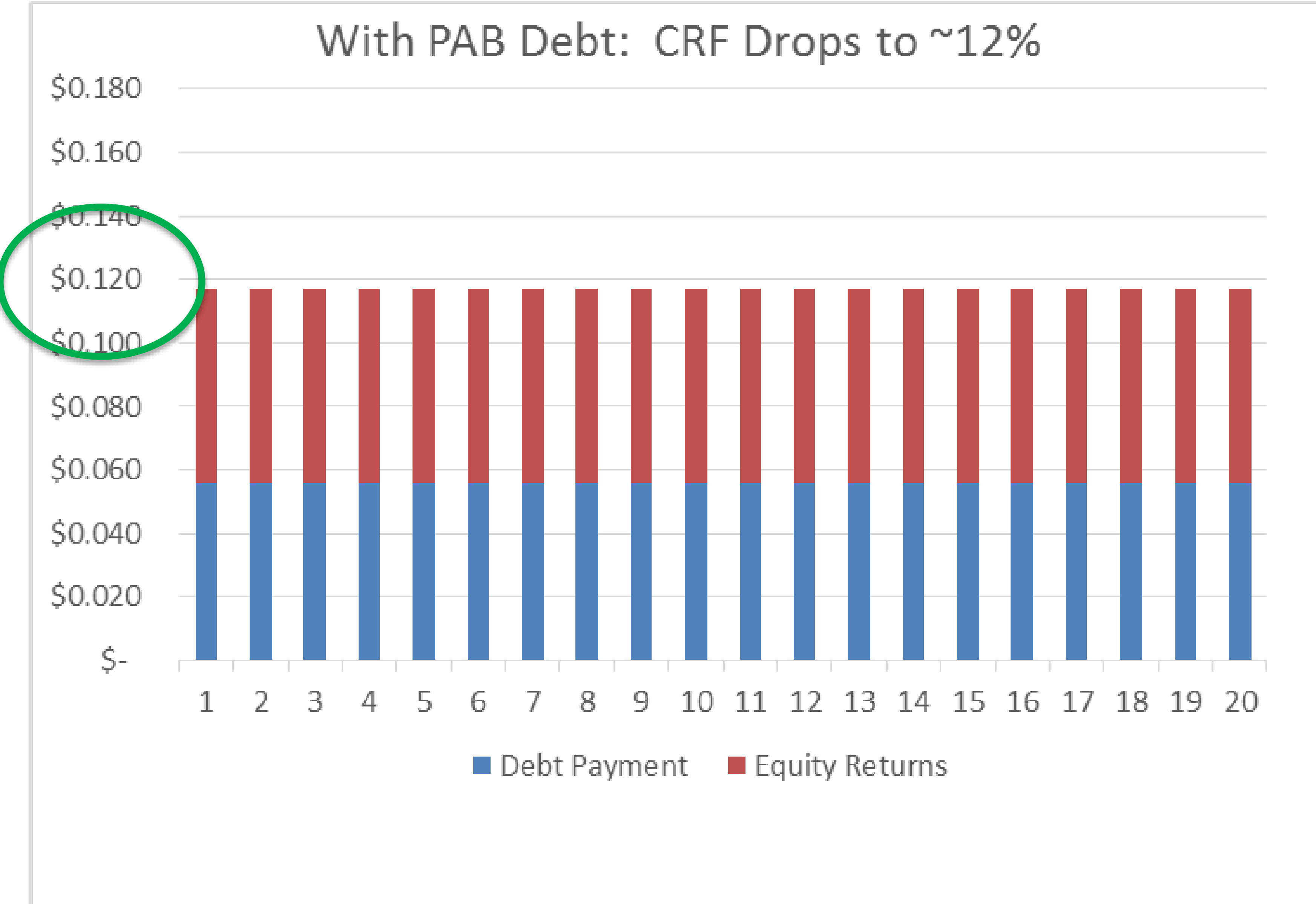
How Do I Measure Capital Cost

- For project finance I use the concept of "**capital recovery factor**"
  - I need to pay back both interest and principal on debt.
  - I need to pay back both a running equity return plus the equity capital invested.
- Much higher than "weighted average cost of capital" because fully returning principal invested.

Status Quo: ~16% Cap Recovery Factor



PABs Drop Total CRF by 4%

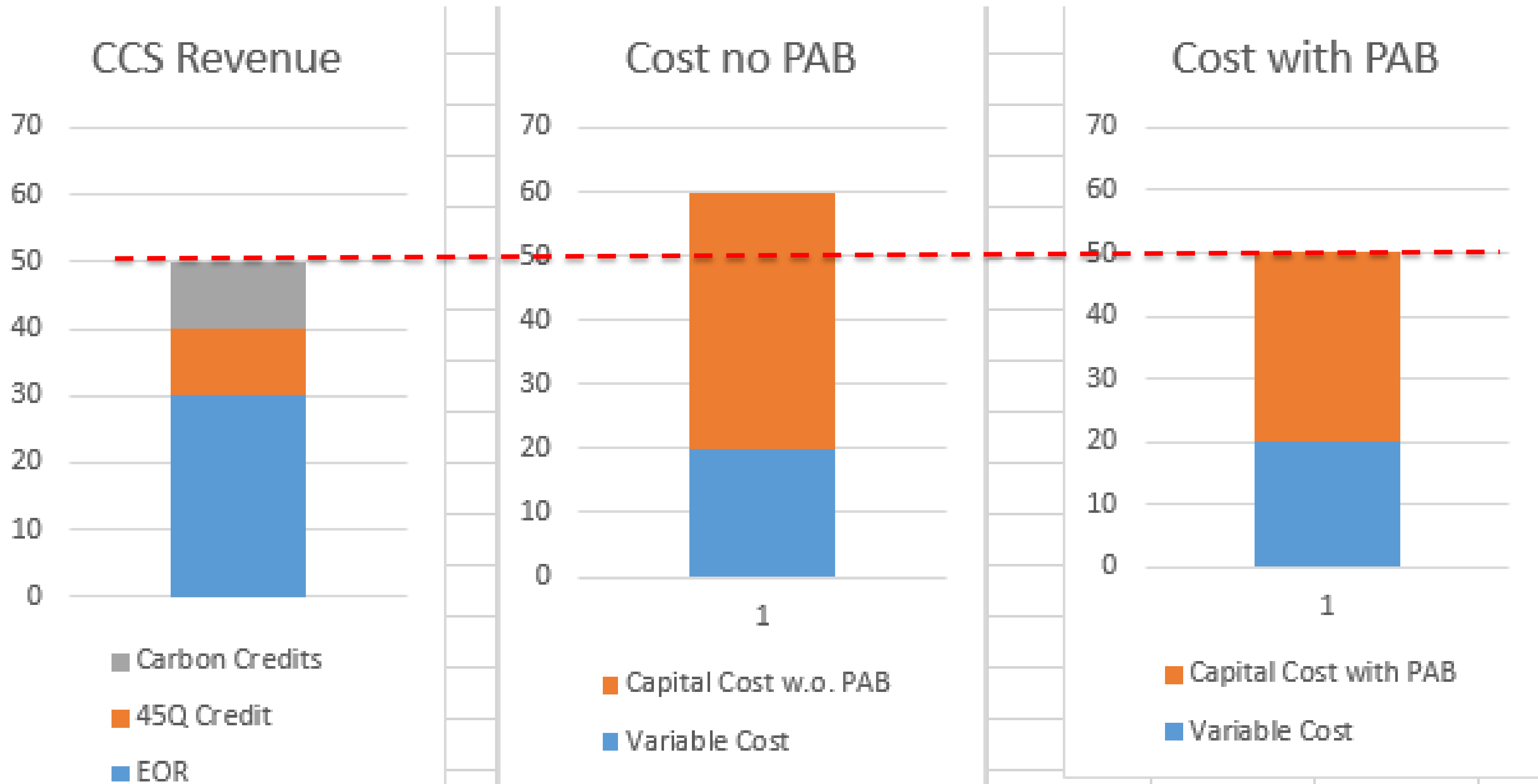


Tale of Two Markets

If a CCS project is stuck with bad debt options:

- Annual debt payments skyrocket because so much principal must be paid back so quickly.
- The debt is now riskier because smaller safety margin between revenues and debt payments.
- Also, with debt payments high, equity dividends have to be deferred and are riskier, driving up the cost of equity as well.

Cost Impact of PABs (dollars per ton of CO_2 captured)—25% reduction in Capital Cost



IRC Section 142

Fifteen things you can finance with private activity bonds—stuff owned or virtually owned by private parties that still get to use tax-exempt bonds (like your local city hall):

1. Airports
2. seaports
3. Industrial sewage treatment
4. Hazardous waste facilities
5. High-speed intercity rail
6. Hazardous waste facilities
7. "Solid waste" handling facilities

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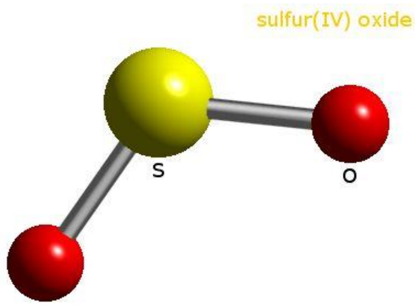
+ 16. qualified carbon dioxide capture facilities.

A Tale of Two Acid Gas Molecules



SO2

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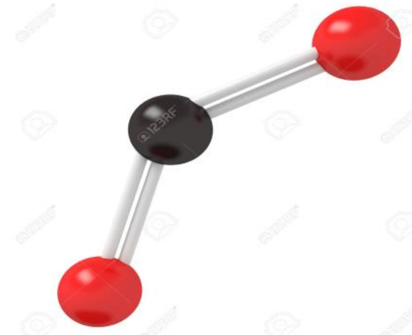

CO2

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- Private Activity Bond authorizations can be quite arcane, rife with the accidents of history.
- PABs are authorized for “solid waste disposal facilities”– and when you spray **SO2** with limestone you get “solid waste”—cheap finance
- PABs not authorized for spraying **CO2** with solvent because you get a “gaseous waste”—no cheap finance

Speaking of Accidents

- You don't need this legislation if you can get your CCS plant sited someplace that garnered Congressional sympathy.

Recent Interesting Examples: NRG

$54,000,000
Fort Bend County Industrial Development Corporation
Industrial Development Revenue Bonds
(NRG Energy, Inc. Project) Series 2012

Interest Accrual Date: Date of Issuance **Due: May 1, 2038**

Fort Bend County Industrial Development Corporation (the "*Issuer*") is issuing the above-referenced bonds (the "*Bonds*") pursuant to a Bond Indenture, dated as of May 1, 2012 (the "*Bond Indenture*"), between the Issuer and Wells Fargo Bank, National Association, as trustee (the "*Trustee*"). Proceeds of the Bonds will be loaned by the Issuer to NRG Energy, Inc. (the "*Borrower*") pursuant to a Loan Agreement, dated as of May 1, 2012, to finance a portion of the costs of constructing the Project described herein and to pay certain costs of issuance of the Bonds. The Bonds are issued as qualified Hurricane Ike disaster area bonds pursuant to the Act (as defined herein) and in accordance with Section 704 of the Heartland Disaster Tax Relief Act of 2008.

Hurricane Ike Disaster Relief Bonds

Recent Interesting Examples: Lake Charles Pet-coke Gasification

$1,000,000,000
Lake Charles Harbor and Terminal District
Revenue Bonds
(Lake Charles Cogeneration LLC Project)
Series 2008

Dated: Date of Issuance — **Due: March 15, 2038**
Price: 100% — **CUSIP #: 507739 AH3**

The Lake Charles Harbor and Terminal District Revenue Bonds (Lake Charles Cogeneration LLC Project) Series 2008 (the "Bonds") are being issued to finance a portion of the costs of the development, acquisition, design, engineering, permitting, equipping, construction, installation, improvement, commissioning, start-up and testing of a petroleum coke and coal fueled poly-generation gasification facility to be located in the Parish of Calcasieu, Louisiana. See "THE PROJECT" herein. The Bonds will be issued pursuant to a Trust Indenture dated as of March 15, 2008 (the "Indenture"), by and between the Lake Charles Harbor and Terminal District (the "Issuer") and The Bank of New York Trust Company, N.A., as trustee (the "Trustee").

Hurricane Katrina "Gulf Opportunity Zone" Bonds

Recent Interesting Examples: OCI

New Issue—Book Entry Only **Ratings: See "RATINGS" herein.**

$1,184,660,000
Iowa Finance Authority
Midwestern Disaster Area Revenue Bonds
(Iowa Fertilizer Company Project), Series 2013

Dated: Date of Issuance **Due: As shown on the Inside Cover**

The Iowa Finance Authority Midwestern Disaster Area Revenue Bonds (Iowa Fertilizer Company Project), Series 2013 (the "Series 2013 Bonds") are being issued, and the proceeds thereof will be loaned to Iowa Fertilizer Company LLC (the "Company"), to refinance the Iowa Finance Authority Midwestern Disaster Area Revenue Bonds (Iowa Fertilizer Company Project), Series 2012 (the "Prior Bonds"). The Prior Bonds were issued to finance or refinance, together with other available moneys, (i) a portion of the costs of the acquisition of land and the development, construction, equipping and furnishing of a nitrogen fertilizer plant and certain infrastructure improvements, including improvements to the surrounding roadways, sewage system extension and other improvements, to be located in Lee County, Iowa, (ii) capitalized interest, (iii) a deposit to the Debt Service Reserve Fund and (iv) the costs of issuance. See "THE PROJECT" herein. The Series 2013 Bonds will be issued pursuant to an Indenture dated as of May 1, 2013 (the "Indenture"), by and between the Iowa Finance Authority (the "Issuer") and Citibank, N.A., as trustee (the "Trustee").

Mid-West Flood Bonds

Conclusion

- Bill introduced—Senators Portman (R-Ohio) and Bennet (D-Colorado)
- Bi-partisan support
- Extremely low "fiscal score"
- Tried and tested tool
- Game-changer on financing front
- Necessary, but not sufficient; listen to the later panel