Electric Utilities...

Navigating the Ever-changing Environmental Landscape
Agenda

- Energy and Electric Power in Louisiana

- Near-term Environmental Compliance Challenges
  - Cross State Air Pollution Rule (CSAPR)
  - Mercury and Air Toxics Standards (MATS)

- Longer-term Environmental Compliance Challenges
  - 316(b) Cooling water intake structure rules
  - National Ambient Air Quality Standards (NAAQS)
  - Regulation of Coal Ash and other residuals
  - Greenhouse Gases (GHG) from new and modified sources
  - Water effluent guidelines
LA Energy Production Estimates, 2010

- Natural Gas
- Crude Oil
- Nuclear Electric Power
- Other Renewable Energy
- Coal
- Biofuels

Source: Energy Information Administration, State Energy Data System
Louisiana’s Natural Gas Production is Up!

Annual natural gas production from top five U.S. states, 2000-2011

Source: EIA
LA Energy Consumption Estimates, 2010

Source: Energy Information Administration, State Energy Data System
Energy Consumption by End-Use Sector, 2010 (Trillion Btu)

Source: Energy Information Administration, State Energy Data System
### Ten Largest Plants by Generating Capacity

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Fuel Type</th>
<th>Plant Operator</th>
<th>Technology Type</th>
<th>Operating Capacity (MW)</th>
<th>COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willow Glen</td>
<td>Gas</td>
<td>Entergy Gulf States Louisiana, LLC</td>
<td>Steam Turbine</td>
<td>1,790</td>
<td>1960</td>
</tr>
<tr>
<td>Ninemile</td>
<td>Gas</td>
<td>Entergy Louisiana Holdings, Inc.</td>
<td>Steam Turbine</td>
<td>1,760</td>
<td>1951</td>
</tr>
<tr>
<td>Big Cajun 2</td>
<td>Coal</td>
<td>Louisiana Generating LLC</td>
<td>Steam Turbine</td>
<td>1,743</td>
<td>1981</td>
</tr>
<tr>
<td>Brame Energy Center</td>
<td>Gas/Coal</td>
<td>Cleco Power LLC</td>
<td>Steam Turbine</td>
<td>1,552</td>
<td>1975/1982/2010</td>
</tr>
<tr>
<td>Acadia Energy Center</td>
<td>Gas</td>
<td>Cleco Power LLC/Entergy Louisiana LLC</td>
<td>Combined Cycle</td>
<td>1,242</td>
<td>2002</td>
</tr>
<tr>
<td>Little Gypsy</td>
<td>Gas</td>
<td>Entergy Louisiana Holdings, Inc.</td>
<td>Steam Turbine</td>
<td>1,189</td>
<td>1961</td>
</tr>
<tr>
<td>Waterford 3</td>
<td>Nuclear</td>
<td>Entergy Louisiana Holdings, Inc.</td>
<td>Nuclear</td>
<td>1,180</td>
<td>1985</td>
</tr>
<tr>
<td>River Bend</td>
<td>Nuclear</td>
<td>Entergy Gulf States Louisiana, LLC</td>
<td>Nuclear</td>
<td>988</td>
<td>1986</td>
</tr>
<tr>
<td>Plaquemine Cogeneration</td>
<td>Gas</td>
<td>Dow Chemical Company</td>
<td>Combined Cycle</td>
<td>933</td>
<td>2004</td>
</tr>
</tbody>
</table>

Source: SNL
## LA Electric Power - Generation & Capacity

<table>
<thead>
<tr>
<th>Source: Energy Information Administration, State Energy Data System</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Capacity</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>19,574 MW</td>
<td>51,344,079 MWh</td>
</tr>
<tr>
<td>Coal</td>
<td>3,417 MW</td>
<td>23,923,749 MWh</td>
</tr>
<tr>
<td>Nuclear</td>
<td>2,142 MW</td>
<td>18,639,347 MWh</td>
</tr>
<tr>
<td>Petroleum</td>
<td>881 MW</td>
<td>5,696,922 MWh</td>
</tr>
<tr>
<td>Other</td>
<td>730 MW</td>
<td>3,280,844 MWh</td>
</tr>
</tbody>
</table>
In late summer 2012, coal produced 39% of U.S. electricity, up from a low of 32% in spring 2012, when the natural gas share of generation equaled that of coal.

Source: EIA
Cleco Power’s Change in Dispatch

Energy mix impacts due to reductions in gas price

Energy Mix - September 2011

Energy Mix - September 2012 (Estimate)
Environmental Regulations Overview

**Finalized Rules**
- CSAPR (depends on Court)
- MATS
- NAAQS Ozone
- NAAQS SO₂
- Regional haze

**Proposed Rules**
- 316(b) cooling water intake rule
- Coal ash
- New National Ambient Air Quality Standards
- GHG NSPS
- EGU Effluent Guidelines (not yet proposed)

**Future Drivers of Regulations**
- Expirations of exemptions
- States’ inability to meet federal rules
- More scientific data
- Legislation by individual states
- Litigation by states and environmental groups

EGU’s will have to navigate through a maze of regulatory unknowns to ensure that customer’s power supply remains **reliable** and **affordable**
Near-term Environmental Compliance Concerns

Cross-State Air Pollution Rule (CSAPR)
- Purpose is to reduce NOx and SO$_2$ in 28 states
- Emissions trading based rule
- Applied to Electric Generating Units only (EGU’s)

Mercury and Air Toxics Rule (MATS)
- Title III of CAA – Control of Hazardous Air Pollutants
- Command & Control Rule Based
- Imposes specific numeric standards for hazardous air pollutants from coal and oil-fried utility boilers
CROSS STATE AIR POLLUTION RULE (CSAPR)
Premise behind the CSAPR rule.....

Don’t blame me, its HIS fault...

Nuh-uh....I can’t comply ‘cause its HIS fault

“It’s The Other Guy’s Fault!”
Louisiana “Linkages”

Key to Arrows:

- Upwind-downwind linkage for Ozone
### Cleco Power CSAPR Allocations

<table>
<thead>
<tr>
<th>Date</th>
<th>Original Transport Rule</th>
<th>1st NODA</th>
<th>3rd NODA Method 1</th>
<th>3rd NODA Method 2</th>
<th>July 2011 Final Rule Allocation</th>
<th>Feb 2012 Revisions Rule</th>
<th>Feb 2012 Direct Final Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,445</td>
<td>3,107</td>
<td>1,669</td>
<td>1,926</td>
<td>1,588</td>
<td>2,091</td>
<td>2,122</td>
</tr>
</tbody>
</table>

61% reduction of allowances from Aug 2010 to June 2012
Latest on CSAPR

- On August 21st the D.C. Circuit Court of Appeals vacated CSAPR by a 2-1 vote. The Court ruled that EPA’s exceed its authority under the CAA in two key areas:
  1. CSAPR required upwind states to reduce their emissions beyond their “significant contributions” to downwind states, and
  2. EPA’s simultaneous issuance of the CSAPR rule and CSAPR “FIPs” did not provide states adequate time to develop their own SIP to address emission transport issues

...the “good neighbor provision” of the Act was not a “blank check” for EPA to regulate interstate pollution....

...CSAPR’s federal-first regulation regime violated the Clean Air Act’s “cooperative federalism” structure.....

- The Court ordered EPA to rewrite the rule in an expeditious fashion

- CAIR is reinstated as law of the land....for now
  - CAIR itself has been ruled illegal
  - EPA has requested a rehearing, so we’re back in limbo until we hear from the D.C. Circuit Court

- The Allowance Market for CAIR allowances are depressed
  - Significant bank of SO\(_2\) allowances
  - Unlike CSAPR, unlimited trading between states, units, etc.
Future CSAPR Uncertainties

- Will the Court rehear the case?
  - And if it is reheard, what’s the outcome?

- Will EPA begin writing a new rule to address emission transport issues?
  - Will the scope of a new rule go beyond EGU’s?
  - Will EPA issue a SIP call to states (3 year process)?

- Would a new rule be issued to address newer PM 2.5 and Ozone standards?
  - CSPAR addressed old standards: 1997-annual PM2.5, 1997-Ozone, 2006-24hr PM2.5

- How does this impact Regional Haze rule compliance?

- Other than an overturned decision from the Court, a new transport rule is likely delayed
MERCURY AND AIR TOXICS STANDARDS (MATS)
Utility MATS Rule

- By far....the toughest rule to ever affect EGU’s

- Strict “Command & Control” numeric emission limits
  - Hard-number limits for Mercury, Particulate Matter (metals), HCl (acid gas)
  - Must meet the limit achieved by the top performing 12% of similar sources
  - Work practice standards (no hard-number limits) for Dioxin/furans
  - Strict monitoring, reporting and recordkeeping
  - Strict startup/shutdown provisions
    - Revised definitions of su/sd to cover only those periods in which “no electricity is being sold or used onsite”

- Compliance required by April, 2015, unless 1-yr extension is granted by permitting authority
  - Some existing units comply w/current controls
  - Some units will retire rather than invest in controls
  - “Reliability critical units” can operate under an Administrative Order
Utility MATS Rule

- For most affected coal-fired units, required controls include:
  - Activated Carbon Injection (ACI) – 90 GW
  - Upgraded particulate controls – 150 GW
  - Dry Sorbent Injection (DSI) – 75 GW  - OR-  Dry Scrubber – 15 GW

Controls to cost $100 - $200 million for the average coal plant

- Rule was challenged
  - Standards and methods of obtaining the standards
  - Additional time for compliance
  - NSPS issued with this rule
Impacts of the Rule

Approximately 60 GW to retire by 2016 driven by:

- Lower natural gas prices
- Cost of controls
- Speculation of other environmental regulations (316(b), Coal Ash, Effluent Standards, Carbon)
## MATS Emission Limits

<table>
<thead>
<tr>
<th>Subcategory</th>
<th>Filterable Particulate Matter</th>
<th>Hydrogen Chloride</th>
<th>Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing coal</td>
<td>0.03 lb/MMBtu</td>
<td>0.002 lb/MMBtu</td>
<td>1.2 lb/TBtu</td>
</tr>
<tr>
<td>Existing coal (lignite)</td>
<td>0.03 lb/MMBtu</td>
<td>0.002 lb/MMBtu</td>
<td>4.0 lb/TBtu*</td>
</tr>
<tr>
<td>Existing IGCC</td>
<td>0.04 lb/MMBtu</td>
<td>0.0005 lb/MMBtu</td>
<td>2.5 lb/TBtu</td>
</tr>
<tr>
<td>Existing solid-oil derived</td>
<td>0.008 lb/MMBtu</td>
<td>0.005 lb/MMBtu</td>
<td>0.2 lb/TBtu</td>
</tr>
<tr>
<td>New coal</td>
<td>0.007 lb/MWh</td>
<td>0.4 lb/GWh</td>
<td>0.0002 lb/GWh</td>
</tr>
<tr>
<td>New coal (lignite)</td>
<td>0.007 lb/MWh</td>
<td>0.4 lb/GWh</td>
<td>0.04 lb/GWh</td>
</tr>
</tbody>
</table>

*EPA went beyond the floor with a limit of 4 lb/TBtu for existing lignite units. The limit was initially established at 11 lb/Tbtu.
OTHER ENVIRONMENTAL REGULATIONS
Longer-term Environmental Compliance Concerns

- **316(b) Cooling Water Intake Rule**
  - To protect fish and aquatic life from cooling water intakes

- **NAAQS Standards**
  - Ozone
  - SO₂

- **Coal Ash**

- **Carbon**
  - Permitting
  - NSPS

- **Steam Effluent Guidelines**
  - Reduce metals and other pollutants from steam electric power plant water discharges
o Sets separate standards for "Impingement" of fish and "Entrainment" of fish and larvae
  • Applies to ALL species

o “Impingement” - Two Compliance Options
  • No more than 12% mortality annual avg (31% monthly avg,)
    -OR-
  • Water Intake Velocity ≤ 0.5 feet per second

o “Entrainment” – Compliance Determined at State Level
  • Case-by-case entrainment mortality limits based on site-specific analysis
  • 4 Studies - (Characterization Study, Technical Feasibility and Cost Evaluation, Benefits Valuation, Non-water quality impacts)
  • BTA is determined - Permit writer must defend his technology choice

o New Units – flow commensurate with closed cycle cooling

o Final Rule Expected no later than June 27, 2013
NAAQS Requirements

- **Ozone - 2008 standard of 75 ppb in effect**
  - Attainment area designations made by LDEQ
    - 5 Parish Baton Rouge Area marginal nonattainment
  - Compliance required by affected sources as early as December 2015
  - In 2014 - anticipate further reductions by EPA under normal review cycle (55 ppb?)

- **SO\textsubscript{2} – June 2010 EPA lowered the standard to 75 ppb**
  - Attainment area designations by June 2013 by EPA
    - Recently extended by EPA
  - SIPS addressing non-attainment areas due Feb 2015
  - Compliance required of affected sources as early as 2017-18
  - States could call for further reductions of SO\textsubscript{2} under this rule
  - Power plants predominant SO\textsubscript{2} emitter in the US and in LA
  - However, large sources may not be the problem
Nonattainment Areas for 2008 Ozone NAAQS
(Effective July 20, 2012)
SO$_2$ Monitoring Data

Legend
- ▲ Above 2010 1 Hour NAAQS
- ▼ Below 2010 1 Hour NAAQS

59 violating monitors in 18 states and 1 territory, (48 counties)

2008-2010 design values
Coal Ash Regulations Delayed...

**Subtitle C – Hazardous Waste**
- Treatment Ponds must be closed 5-7 years after final rule (2017-19) – no water discharges unless treated
- Landfill liners on new cells must meet stringent new requirements
- Stringent groundwater monitoring
- Stringent permit requirements for Tanks, Silos, Buildings used to handle ash

**Subtitle D – Industrial Waste**
- Treatment Ponds closed after 5 years or retrofitted with new liners and leachate collection
- Landfill liners on new cells must meet stringent new requirements
- Stringent groundwater requirements
- No requirements for Tanks, Silos, Buildings used to handle ash

Final rule delayed pending NODA - final rule expected mid-2013?
Greenhouse Gas (GHG) Regulations

- In June, the D.C. Circuit Court ruled against industry and in favor of EPA’s GHG rules
  - Ruling confirms the EPA’s endangerment finding, timing rule, and tailoring rule
- Existing units not impacted unless a “major modification” is made to a unit
  - Triggers a “best available control technology (BACT)” evaluation
  - For now, a BACT analysis consists of consideration of energy efficiency in various aspects of the generation cycle
  - Over time requirements will be come more stringent as technology advances
  - Expect permitting delays from environmentalist intervening in permitting new sources or modifying existing sources
- New units must address GHG’s in permit applications

New Source Performance Standards (NSPS)

- EPA promulgated an NSPS for new sources (none for existing sources…yet)
- Standard is CO$_2$ emission rate equal to that of a CCGT (1,000 lbs/MWhr)
  - State of the art coal unit CO$_2$ emissions are 2,200 lbs/MWhr
EGU Effluent Guidelines

- Rule proposal – December 2012
- Rule finalized – May 2014
- Rule Focus – Reduction of metals discharge to surface waters
  - Expected lower discharge limits - As, Cr, Cu, Se, Zn in PPB range and Hg in the PPT range
- Sources of pollutants - Ash impoundments and landfill runoff/leachate
- Possible compliance/treatment options:
  - Zero discharge (dry ash handling or thermal evaporation) and daily landfill cover
  - Chemical precipitation
  - Chemical precipitation followed by biological treatment
### Likely controls to consider*

<table>
<thead>
<tr>
<th></th>
<th>CSAPR (or Sub)</th>
<th>MATS</th>
<th>NAAQS Ozone</th>
<th>NAAQS SO2</th>
<th>316(b)</th>
<th>Coal Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Legacy Coal</strong></td>
<td>SNCR</td>
<td>Sorbent Injection, Baghouse, ACI</td>
<td>SCR ?</td>
<td>Scrubbers, 2nd Stage Sorbent-Injection</td>
<td>Intake Mods</td>
<td>Liners, close/modify ponds</td>
</tr>
<tr>
<td><strong>New Coal</strong></td>
<td>---</td>
<td>ACI</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>Likely up to standards</td>
</tr>
<tr>
<td><strong>Legacy Gas</strong></td>
<td>LNB’s</td>
<td>---</td>
<td>SNCR/FGR</td>
<td>Remove Oil Firing</td>
<td>Intake Mods</td>
<td>---</td>
</tr>
<tr>
<td><strong>CCGT Gas</strong></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

*The jury is still out on EGU effluent guidelines.*
Renewable Energy Standards

LA: 304 MW pilot program
Questions?