Policy Decisions Behind GRU’s Future Electric Power Supply Plan

February 16, 2012
Ed Regan
Let’s Set the Stage

• Who is GRU?
• What are our power supply issues?
• What were our policy considerations?
• What were our technology decisions?
• What’s the plan?
• What will it cost?
A little about Gainesville…

• City population of 130,500
  – More than 60 square miles
  – Fourteenth largest in Florida
• County population of 252,000
• Average 2,800 hours of sunshine annually
• January average high temperature: 67 F
• June average high temperature: 91 F
We have these...
And these…

- Home to the University of Florida, annual enrollment of 50,000
- Santa Fe College, annual enrollment of 16,000
A little about GRU

• “AA” bond rated multi-service utility providing electric, gas, water, wastewater and telecommunications services

• 93,000 electric retail customers in Gainesville and portions of Alachua County
  – Summer peak 481 MW
  – Total installed coal, gas, nuclear capacity 608 MW
  – Total solar and landfill gas power purchases 16.5 MW
  – Biomass power purchase under construction 100 MW

• Very environmentally concerned customer base
Our Generation Fleet is Aging

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Unit Type</th>
<th>Primary Fuel</th>
<th>Age in Years</th>
<th>Summer Net Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JR Kelly Unit 7</td>
<td>Steam Turbine</td>
<td>Natural Gas</td>
<td>50.1</td>
<td>23.20</td>
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<tr>
<td>JR Kelly GT1</td>
<td>Gas Turbine</td>
<td>Natural Gas</td>
<td>43.6</td>
<td>14.00</td>
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<tr>
<td>JR Kelly GT2</td>
<td>Gas Turbine</td>
<td>Natural Gas</td>
<td>43.0</td>
<td>14.00</td>
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<tr>
<td>JR Kelly GT3</td>
<td>Gas Turbine</td>
<td>Natural Gas</td>
<td>42.3</td>
<td>14.00</td>
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<tr>
<td>Deerhaven Unit 1</td>
<td>Steam Turbine</td>
<td>Natural Gas</td>
<td>39.1</td>
<td>78.00</td>
</tr>
<tr>
<td>Deerhaven GT1</td>
<td>Gas Turbine</td>
<td>Natural Gas</td>
<td>35.2</td>
<td>17.50</td>
</tr>
<tr>
<td>Deerhaven GT2</td>
<td>Gas Turbine</td>
<td>Natural Gas</td>
<td>35.1</td>
<td>17.50</td>
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<tr>
<td>Crystal River Unit 3</td>
<td>Steam Turbine</td>
<td>Nuclear</td>
<td>34.5</td>
<td>11.85</td>
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<tr>
<td>Deerhaven Unit 2</td>
<td>Steam Turbine</td>
<td>Coal</td>
<td>29.9</td>
<td>222.10</td>
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<tr>
<td>Deerhaven GT3</td>
<td>Gas Turbine</td>
<td>Natural Gas</td>
<td>15.7</td>
<td>75.00</td>
</tr>
<tr>
<td>JR Kelly CC1</td>
<td>Combined Cycle</td>
<td>Natural Gas</td>
<td>10.3</td>
<td>112.00</td>
</tr>
<tr>
<td>South Energy Center GT1</td>
<td>Gas Turbine</td>
<td>Natural Gas</td>
<td>2.3</td>
<td>4.10</td>
</tr>
</tbody>
</table>

Current Year: 2011

Megawatt Weighted Average Age: 28 603.25
We Will Need New Base Load Capacity

15% reserve margin
Summer Peak Base Case Demand
Total Capacity Available
GRU’S Dependency on Gas is Growing

2009 Net Energy for Load by Fuel Type

- Coal: 61.8%
- Natural Gas: 20.2%
- Nuclear: 4.2%
- Landfill Gas: 1.2%
- Purchases: 12.3%
- Solar: 0.0%
- Oil: 0.3%

Key Driver: Fuel Diversity
Florida’s Natural Gas Supplies- Remember Katrina?
Natural Gas Price Difficult To Forecast
Environmental Standards Getting Tougher

- Ozone
  - Revised Ozone NAAQS
  - Beginning CAIR Phase I Seasonal NOx Cap
  - Reconsidered Ozone NAAQS
  - CAIR Vacated
  - CAIR Remanded
  - NO2 Primary NAAQS
  - CO2 Regulation
  - Proposed CAIR Replacement Rule Expected
  - Final CAIR Replacement Rule Expected
  - SO2/NO2 Secondary NAAQS
  - Effluent Guidelines proposed rule expected

- SO2/NO2
  - Proposed CAIR Replacement Rule Expected
  - Final CAIR Replacement Rule Expected
  - Effluent Guidelines Final rule expected
  - 316(b) final rule expected

- CAIR
  - CAIR Phase I Annual SO2 Cap
  - Proposed Rule for CCBs Management
  - Final Rule for CCBs Mgmt
  - HAPs MACT proposed rule
  - HAPs MACT final rule expected
  - Final EPA Nonattainment Designations
  - Begin Compliance Requirements under Final CCB Rule (ground water monitoring, double monitors, closure, dry ash conversion)
  - Compliance with CAIR Replacement Rule

- Water
  - Effluent Guidelines Compliance 3-5 yrs after final rule
  - 316(b) Compliance 3-4 yrs after final rule

- PM2.5
  - PM-2.5 SIPs due ('97)
  - Begin CAIR Phase I Annual NOx Cap
  - Begin CAIR Phase I Annual NOx Cap
  - CAMR & Delisting Rule vacated
  - Final Rule for CCBs Mgmt
  - Next PM-2.5 NAAQS Revision
  - PM-2.5 SIPs due ('06)
  - New PM-2.5 NAAQS Designations

- Ash
  - HAPs MACT Compliance 3 yrs after final rule

- Hg/HAPS
  - Beginning CAIR Phase II Seasonal NOx Cap
  - Beginning CAIR Phase II Seasonal NOx Cap

CO2

-- adapted from Wegman (EPA 2003)
What Were the City Commissions’ Policy Considerations?

• RIM or TRC economic test for conservation planning
  • RIM: Rate Impact Measure test
  • TRC: Total Resource Cost test
• Environmental compliance
• Fuel supply diversification
• Carbon regulation
• Economic and environmental externalities
• Own or buy?
• Indexed or fixed price contract structures
Conservation Program Design

• Lowest rates or lowest price (per average customer)
  – Rate Impact Measure (RIM) test – lowest rates
    • Only marginal production fuel cost savings a benefit
    • Limits DSM program cost-effectiveness
  – Total Resource Cost (TRC) test – maximum benefits
    • All energy cost savings a benefit
    • Maximizes program design

• DSM provides jobs and other externalities
Environmental Compliance

• Clean Air Interstate Rule allowed either:
  – Installation of air emission controls
  – Reliance on purchased air allowances

• Should benefits be in our community or elsewhere?
Economic and Environmental Externalities

• Does job creation count in Gainesville?
• What about the environmental costs of coal mining?
Own or Buy?

- GRU is tax exempt
  - Bond rate spread currently small
- GRU is not able to benefit from:
  - Production tax credits
  - Investment tax credits
  - Depreciation tax credits
  - ITC grant option
- GRU’s culture is to own and operate
Indexed or fixed price contract structures

• Non fuel items:
  – Floating with CPI not generally acceptable for financing
  – Assuming a fixed rate of escalation adds more risk

• Fuel and commodity items
  – Very rare to contract all of this away
What the City Commission Decided

• Least cost to community, not lowest rates
  – Much more conservation deemed cost-effective

• Keep air quality improvements real
  – Install air pollution control

• Manage carbon risk
  – Pursue renewable energy

• Externalities really do matter
  – Example: Job creation an explicit evaluation criteria

• Cost to ratepayers more important than rate basing capital

• Next central station will be biomass
## What were our technology choices?

<table>
<thead>
<tr>
<th>Central Station Power</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>High carbon and externality cost</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Carbon, volatile and increasing price</td>
</tr>
<tr>
<td>Nuclear</td>
<td>Proposed Levy Plant only viable option – insufficient local risk control</td>
</tr>
<tr>
<td>Biomass: forest waste</td>
<td>Abundant locally Only if sustainable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distributed Power</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>Needs market stimulus - FIT</td>
</tr>
<tr>
<td>Co-Generation</td>
<td>Very situational</td>
</tr>
<tr>
<td>Landfill gas</td>
<td>Geographically limited supply</td>
</tr>
<tr>
<td><strong>Energy Conservation</strong></td>
<td><strong>Huge Potential!</strong></td>
</tr>
</tbody>
</table>

## What about?

<table>
<thead>
<tr>
<th>Alternative Technologies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>Low speeds in North Florida</td>
</tr>
<tr>
<td>Geothermal</td>
<td>Not for electricity</td>
</tr>
<tr>
<td>Fuel cells</td>
<td>Not an energy source</td>
</tr>
<tr>
<td>Hydro Power</td>
<td>Florida pretty flat</td>
</tr>
<tr>
<td>Tidal Power</td>
<td>Tidal range in Florida is small</td>
</tr>
</tbody>
</table>
What’s the Plan for GRU?

- Push energy conservation
- Distributed generation (co-generation)
- Keep the existing fleet humming
- Buy “landfill-gas-to-energy” power
- Promote solar technologies
  - Rebates and net metering
  - Feed in tariff
- Central station biomass for long term base load
Conservation Success!

Lowest KWH Per Residential Customer Among Generating Utilities In Florida
Co-Generation at Shands (4 MW)

RETHINKING ENERGY:
EXTREME EFFICIENCY
GRU’s South Energy Center

>70% Thermal Efficiency

4.5 MW
12.47 kV

Inlet Air Cooling Coil

5 PPM NoX

Prime mover 38% Heat Rate Efficiency

Natural Gas

Turbine Exhaust Hot By Pass Stack

Cooling Tower

Cooling Coil

Cooling Tower

CondRW

Water

Process Steam

Deaerator

Steam Turbine Chiller 1200 Ton

Heat Recovery Steam Generator

14,000 lbs/hr

Greater Than 75% IES Efficiency

Exhaust Diverter Valve

HRSG Exhaust Cold Stack

26
$140,000,000 of Air Quality Control
Deerhaven 2 Power Plant

This IS the smoke stack in operation
Landfill Gas to Electricity
Baseline Landfill in Marion County – 3 MW
Creative policies to promote investment and create jobs, while achieving energy goals (13.5 MW)

First European-style solar feed in tariff in the U.S.A
Even the skylight makes electricity at GRU’s administrative headquarters.
The biomass plant under construction at Deerhaven will:

• be the cleanest in the USA
• create 700 permanent jobs
• help keep north central Florida’s forests as forests
• provide a $31 million per year boost to the local economy
GRU’s Contract With GREC
Minimizes Risk While Capturing Federal Incentives

• Thirty (30) year term
• No construction risk
• No performance risk
  – Guaranteed heat rate
  – No renewal or replacement costs
  – Only pay when energy available
• GRU benefits from federal incentives
• No GRU debt
• Majority of cost fixed for 30 years
  – Small variable O&M indexed to CPI
• Property taxes a pass-through
  – All agencies in Alachua County benefit
Diversified Future Generation Mix

- **2010**
  - Coal: 61.8%
  - Natural Gas: 17.1%
  - Nuclear: 4.1%
  - Landfill Gas: 1.1%
  - Biomass* (GRU retained 50 MW of GREC): 18.6%
  - Oil: 0.2%

- **2015**
  - Coal: 57.9%
  - Natural Gas: 15.4%
  - Nuclear: 5.1%
  - Landfill Gas: 1.5%
  - Solar: 1.5%

* Assumes GRU retains 50 MW of GREC
Local Fuel, Local Jobs, Reliable Supply

<table>
<thead>
<tr>
<th>Year</th>
<th>Out-of-State (%)</th>
<th>Local (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>98.8</td>
<td>1.2</td>
</tr>
<tr>
<td>2015</td>
<td>78.4</td>
<td>21.6</td>
</tr>
</tbody>
</table>

100 YEARS of SERVICE | 1912-2012
Less Market Volatility Exposure

2010

Variable Costs Subject to Market Pricing 94.7%

Fixed Costs Subject to Contract 5.3%

2015

Variable Costs Subject to Market Pricing 73.3%

Fixed Costs Subject to Contract 26.7%
Projected Fuel Adjustment with GREC
Includes effects of solar programs

Assumes that offsets necessary to achieve 10.56 FA impact in 2014 are achieved
GRU: SUPPORTING A STRONG COMMUNITY

• Set for generation capacity through 2032

• Highest % of renewable energy in S.E. USA by 2014

• Substantial protection from future energy crises and carbon regulation

• Reduced exposure to volatile natural gas prices

Contact:
Ed Regan, P.E.
AGM for Strategic Planning
reganej@gru.com
352-393-1272