

***Renewable Energy and
Energy Efficiency Portfolio
Standard (REPS) –
The need for creative
solutions***

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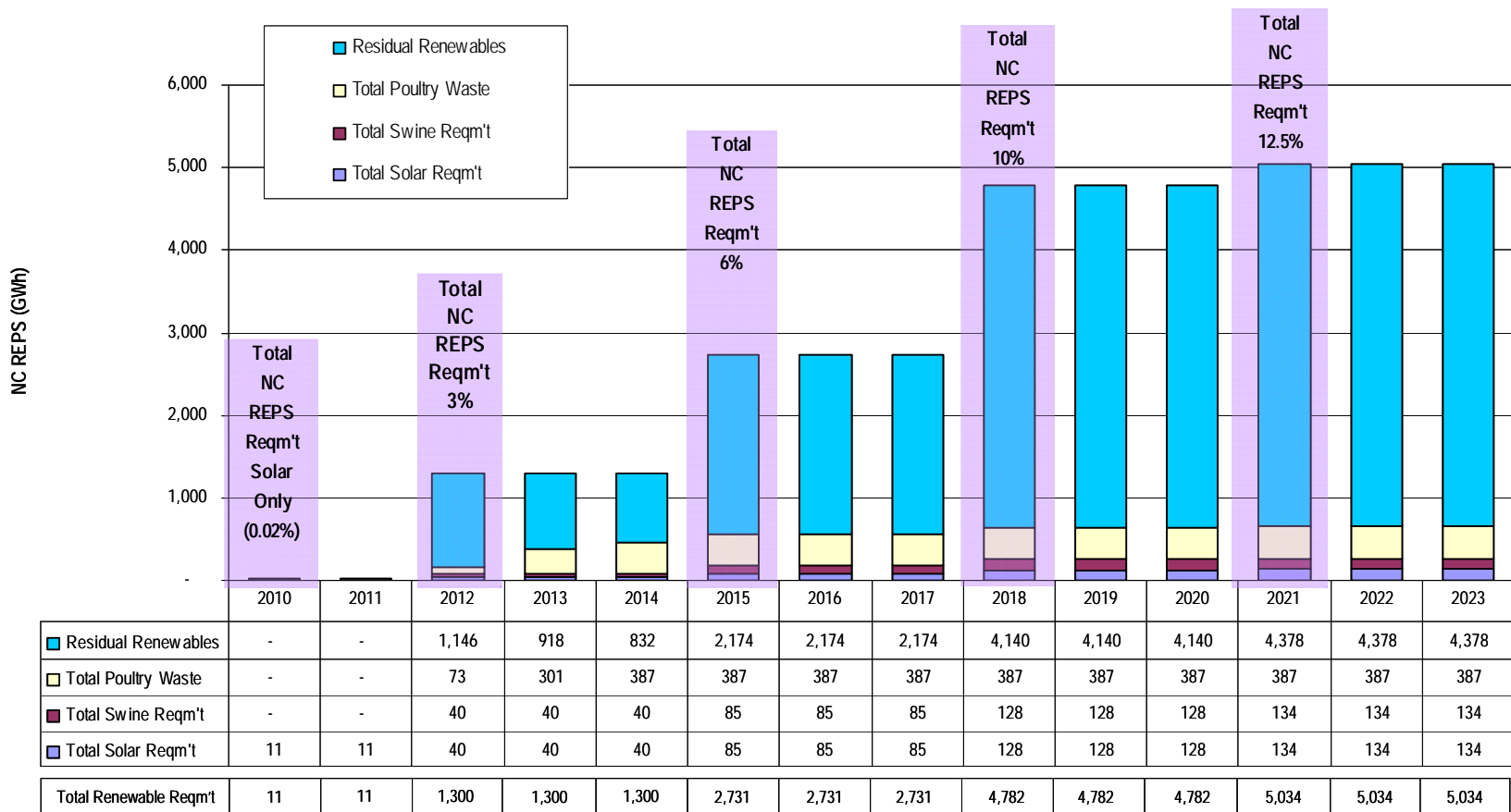
Outline

- Overview of Duke Energy Carolina's Needs
- Overview of Duke Energy Carolina's RFP
- Discussion of Creative Solutions
- Discussion of Issues and Concerns



Duke Energy Carolina's REPS Need¹

Duke Energy Carolinas Renewable Energy Requirements (GWh)
Assumes 25% Energy Efficiency through 2021, 40% 2021+



NOTES: Annual Solar Reqmt's Range from 0.02% to 0.2% ; Annual Swine Reqmt's Range from 0.07% to 0.2% ; Annual Poultry Reqmt's assumes 43% of state reqmt for Duke's portion

1 – The values contained in this table are projections based upon best available data and our subject to change. The projected needs for the Poultry and Swine requirements are an approximation based on an estimate of Duke's share of the NC load.



2007 Renewable Energy RFP Highlights

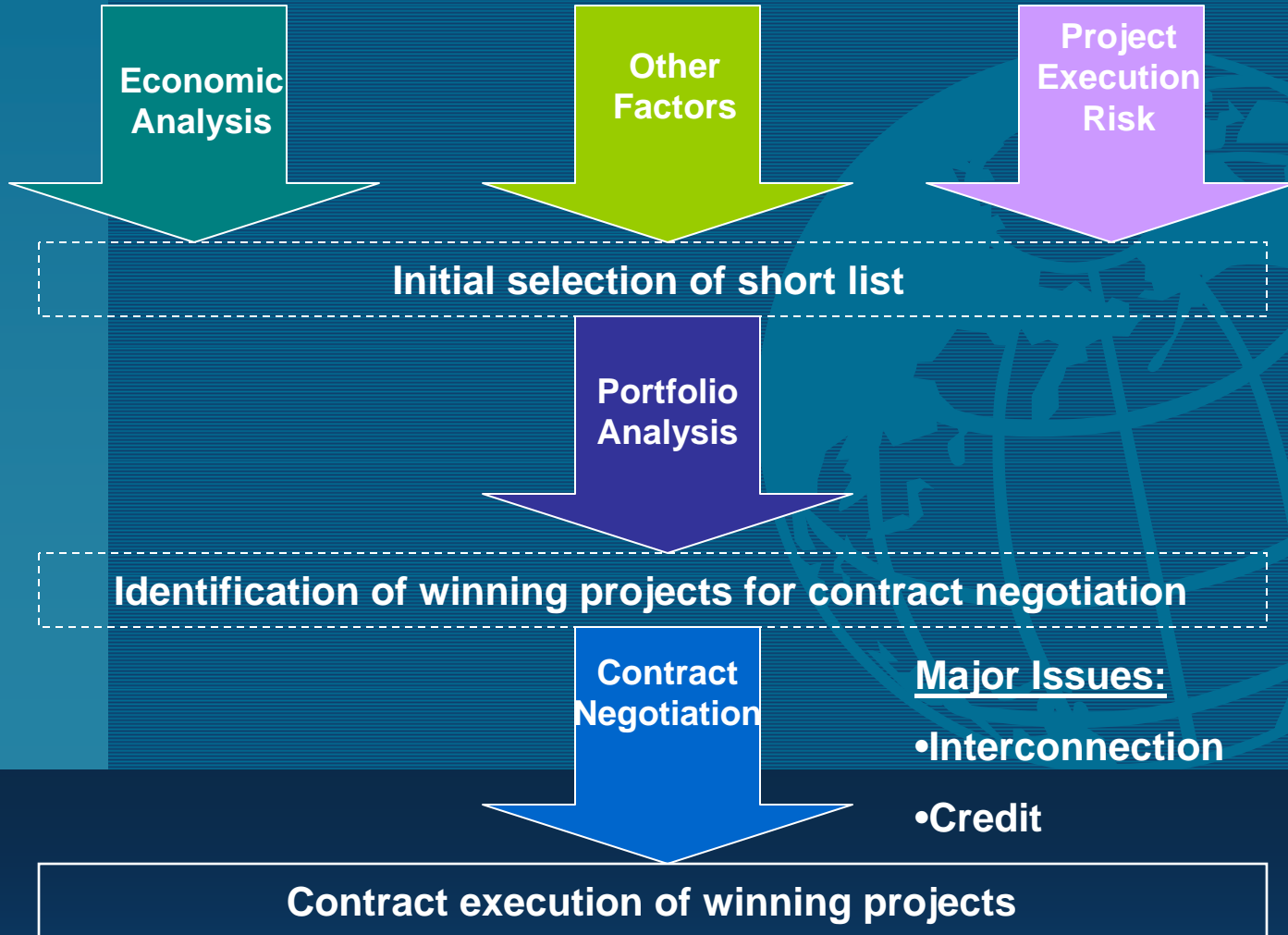
- **4/20/07** - Released 1st “stand-alone” DE renewable energy RFP for the Carolinas
- **5/21/07** – Notice of Intent to Bid received from 74 different companies
- **6/13/07** – Hosted RFP Bidder Conference in Charlotte, NC; attended by 73 people from 33 different companies
- **7/27/07** - Bid proposal packages received from 26 different companies; with a total of 94 different proposal permutations
- **9/18/07** – Identified short list
 - Began negotiations with Tier 1 bidders
 - Tier 2 bidders put on hold, some bids eliminated
- **2nd Quarter 2008** – Complete negotiations on first tranche of contracts

RFP Overview – Bid Proposal

Duke Energy sought:

- Competitive proposals for renewable resources to meet expected REPS obligations
- Proposals that provide the greatest value to Duke customers that provide the best combination of:
 - Price
 - Reliability
 - Flexibility
- Proposals that supply electrical energy and capacity
 - Minimum capacity of 2 MW
 - Deliver at least 3,500 MWH per year at the interconnection point
 - Projects operational and delivering power by 2012
- Purchase Power Agreements (3-30 year terms), Power purchase with buyout, or sale of a generating facility

Bid Evaluation Process



Economic Analysis

- Bids evaluated using a life-cycle benefit-cost approach
 - Benefits quantified similar to an avoided cost methodology to quantify the value of the replacement renewable energy
 - Costs reflect the bidders price proposals
- Economic benefits are quantified in three categories:
 - Energy value
 - Capacity value
 - Environmental value



- Renewable Resource Mix - Seeking alternative resources including but not limited to:
 - Biomass
 - Wind
 - Solar
 - Swine Waste
 - Poultry Litter
- Portfolio Fit – Proposals ability to meet RPS timing and resource needs
- Dispatch flexibility
- Bid structure flexibility
- Deliverability
- Integration with generation fleet



Project Execution Risk

- Overall project viability
- Owner/operator experience
- Proven/reliable technologies
- Project status including:
 - Permits
 - Site Control
 - Equipment
 - Financing
 - Design & Construction
- Transmission/distribution access
- Credit Quality



Bid Economic Ranking Methodology

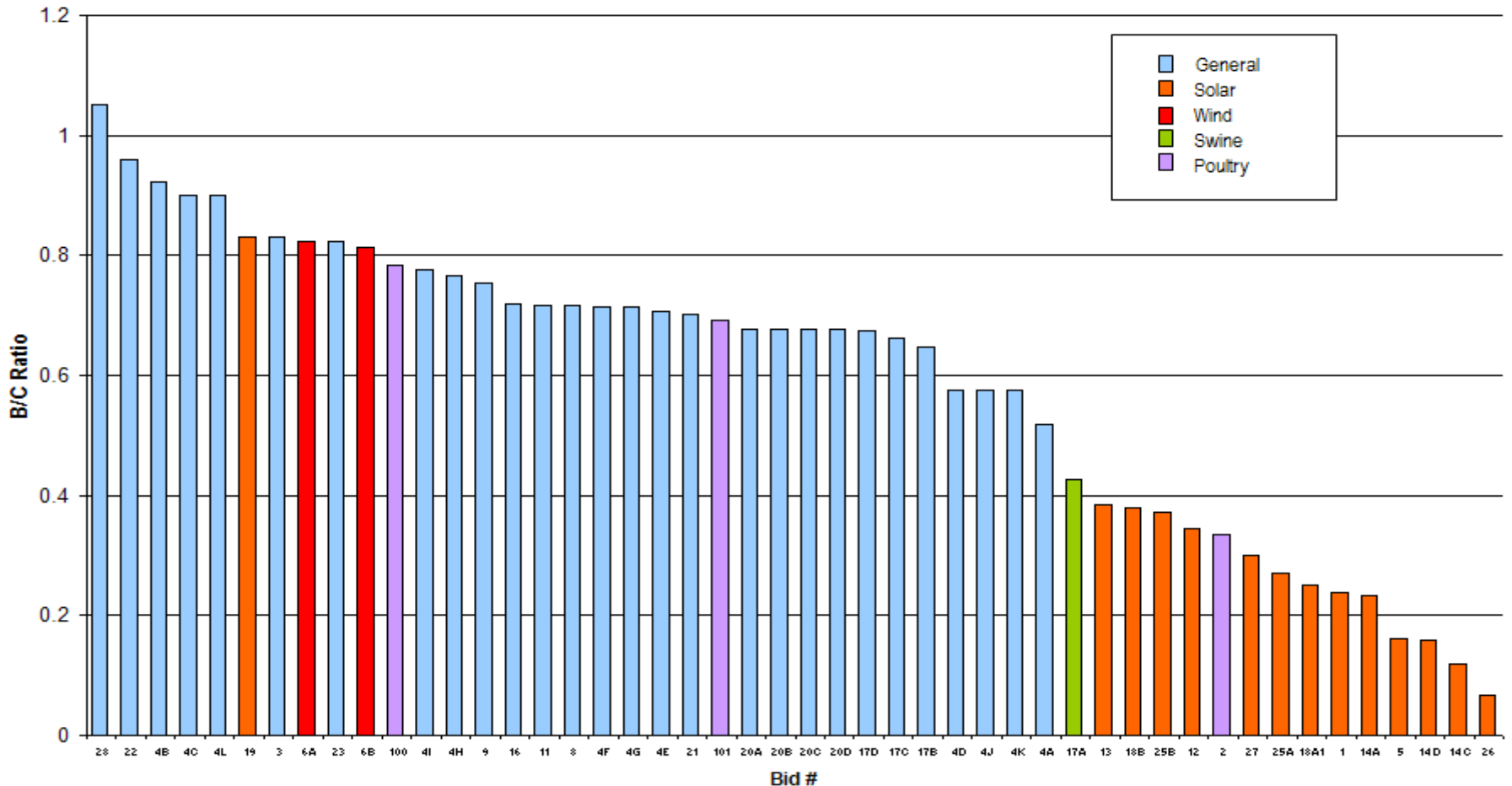
- Benefit/Cost (B/C) Ratios compare the relative value of each bids for each category
- B/C analysis results for the RFP bids generally showed the following highest to lowest relative value trends by technology (note: results prior to negotiations and subject to change during the negotiation process)
 1. Landfill Gas Projects
 2. Bio Wood/ Bio Mass Incineration Projects
 3. Wind
 4. Poultry/ Swine Waste Incineration Projects
 5. Solar



RFP Cost per MWH

Technology	Cost (\$/MWhr (2008\$))
General (LFG, Biomass, & Biogas)	\$50-\$120
Wind	\$70 - \$120
Poultry Waste/Swine Waste	\$95 - \$200
Solar/Solar Thermal	\$95 - \$600

Life Cycle Benefit Cost Valuation



RFP Observations

- Please with the quality and quantity of bids we received
- Actively pursuing contracts with 6 -10 separate projects¹
- Plenty of work still to be done
 - Fill remaining needs
 - Manage renewable portfolio within the cost caps included in SB3
 - Streamline process based on lessons learned

Need for Creative Solutions

- Need to pursue a broad based set of options to ensure that we are meeting the REPS requirements in the most cost effective and reliable manner
 - Customer projects
 - Conversion of waste products to energy
 - Solar (PV)
 - Solar Thermal
 - Co-generation
 - Combined heat and power (CHP) application
 - “Merchant” renewable generation resources
 - Utility ownership of renewable generation resources

Example-Municipal Wastewater Treatment

- Anaerobic digestion produces biogas, the amount of biogas produced varies by season
- Some biogas is consumed by boilers that provide thermal energy to anaerobic digesters' heat load
- Excess biogas is flared
- Some existing facilities use natural gas to supplement heating needs
- Some existing facilities require back-up generation for critical loads

Example-Municipal Wastewater Treatment

Each case is dependent upon the particular needs of the facility and processing rate of the facility

- **Anaerobic digester gas is routed to a prime-mover which produces electricity and thermal energy**
 - Electricity is sold to the utility or used to meet plant electric loads
 - Thermal load from the digesters is met by recovered heat from prime mover
 - Boiler load is decreased potentially eliminating need to supplement with natural gas
- **Benefits of CHP system**
 - Reduces plant operating cost
 - Displaces purchase fuels for other thermal needs
 - Qualifies as a renewable energy source to help meet REPS and reduction in GHG
 - Enhances plant reliability through the additional back-up power supply
 - Potential to provide long-term price stability and decrease fuel cost volatility

Issues and Concerns

- High Failure Rate
- Long Term PPA
 - Cost Recovery
 - Contract Terms – ability to provide renewable resource developers adequate terms to secure financing while protecting customers' interests
- REPS carve-outs
- Utility Ownership
- Ability to comply with the REPS across all technologies within costs caps