

# Nucor Steel – South Carolina

## An Industrial Customer's Perspective on Energy and Electric Rate Issues

Presented by:  
Garrett Stone  
Brickfield, Burchette, Ritts & Stone, P.C.  
April 20, 2011



## Energy Use By Nucor Steel Mills

- Nucor's steel production process uses massive amounts of electric, natural gas, and chemical energy.
- Electric energy (primarily associated with the arc furnaces) is by far the largest energy cost component at a Nucor steel mill and can significantly affect the competitiveness of the mill.



## Energy Use By Nucor Steel Mills (cont'd)

- Nationwide, Nucor uses billions of kWh annually and has a company-wide electric demand and energy use equivalent in size to the entire customer base of a small utility.
- **A single arc furnace, depending on the size, can use roughly 50 to 150 MW of power by itself – to put this in perspective, switching on the furnace is like switching on a million or more light bulbs in the same instant.**



# Electric Arc Furnace Energy Efficiency

- While Nucor's energy use is intensive, the electric arc furnace (EAF) steel making process is much more energy efficient than integrated steel making. Recycling steel scrap:
  - Not only avoids the need for mining and transporting iron ore, coal and other materials, but
  - Utilizes the energy already embodied in the steel scrap (energy that was used to make the steel before it became scrap).
- **US EPA estimates that current EAFs consume only about one quarter of the energy consumed by an integrated steel mill to produce a ton of steel.**
  - (see <http://www.epa.gov/nsr/ghgdocs/ironsteel.pdf>)



# Nucor's Power Suppliers

- Nationwide, Nucor steel mills are served by power suppliers of all types:
  - Investor-Owned Utilities (Progress, Duke, Dominion, Entergy, Southern Co., FirstEnergy, others)
  - State-Owned Utilities (Santee Cooper)
  - Federally-Owned Utilities (TVA)
  - Municipal Utilities (City of Seattle)
  - Public Power Districts (Nebraska PPD)
  - Cooperatives (Mississippi County Electric Cooperative)
  - Competitive Markets (deregulated markets in Texas and Illinois)



# Nucor's Power Supply Objectives

- Nucor's primary power supply objective is always the same – secure, stable, reliable electric service at the lowest possible price.
- Most of Nucor's power supply is typically interruptible or curtailable (this is also true in South Carolina):
  - Nucor shuts down its facilities at the utility's request on short notice when there is insufficient system generation or transmission capacity or during a system emergency;
  - Nucor pays lower curtailable rates reflecting the lower cost of non-firm service; and
  - Nucor takes this lower quality service to remain cost competitive.



# Key Industrial Electric Supply Issues Nationwide

- Impacts of increasing fuel costs, particularly on high load factor industrial customers
- Construction of more generation supply (typically at higher than embedded costs):
  - Regulatory uncertainty with respect to coal and nuclear
  - Concern over fuel prices (particularly natural gas)
  - Fixed versus variable cost issues
- Uncertainty and costs related to possible renewable mandates
- Transmission adequacy
- Efforts to promote demand response, and energy efficiency and DSM programs
- Cost allocation and rate design issues (accurate price signals, time-of-use, etc.)



## Nucor Activity Before Utility Regulatory Commissions

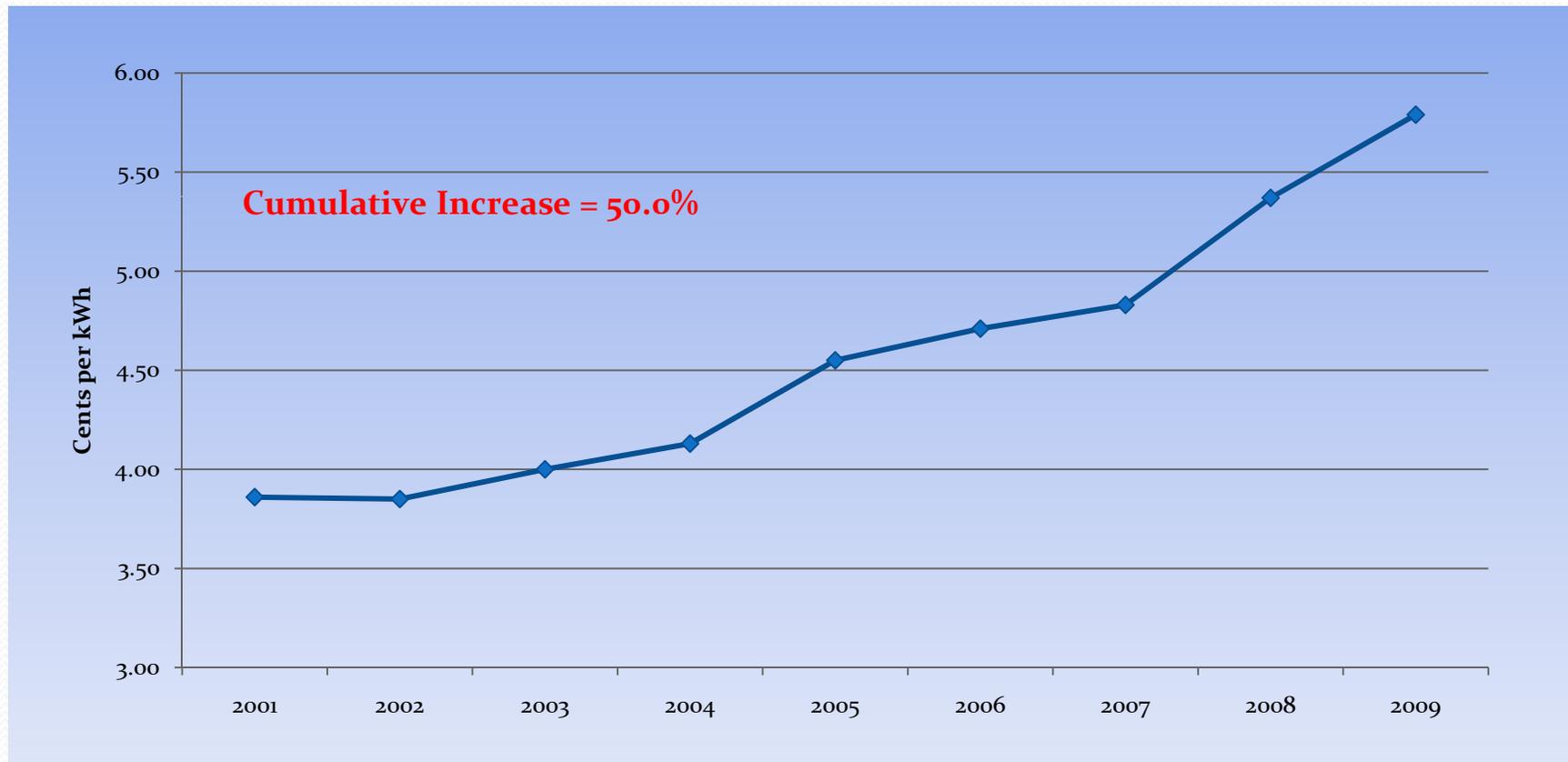
- Nucor plays an active role in regulatory proceedings related to its electric suppliers, particularly as to rate matters.
- We carefully review and analyze all relevant utility filings for their potential impact on Nucor and challenge them when necessary.
- Our approach is both proactive and reactive.
- Because of the cost of participation, we attempt to carefully select issues with the biggest expected impact.



## Increases in electric rates in recent years

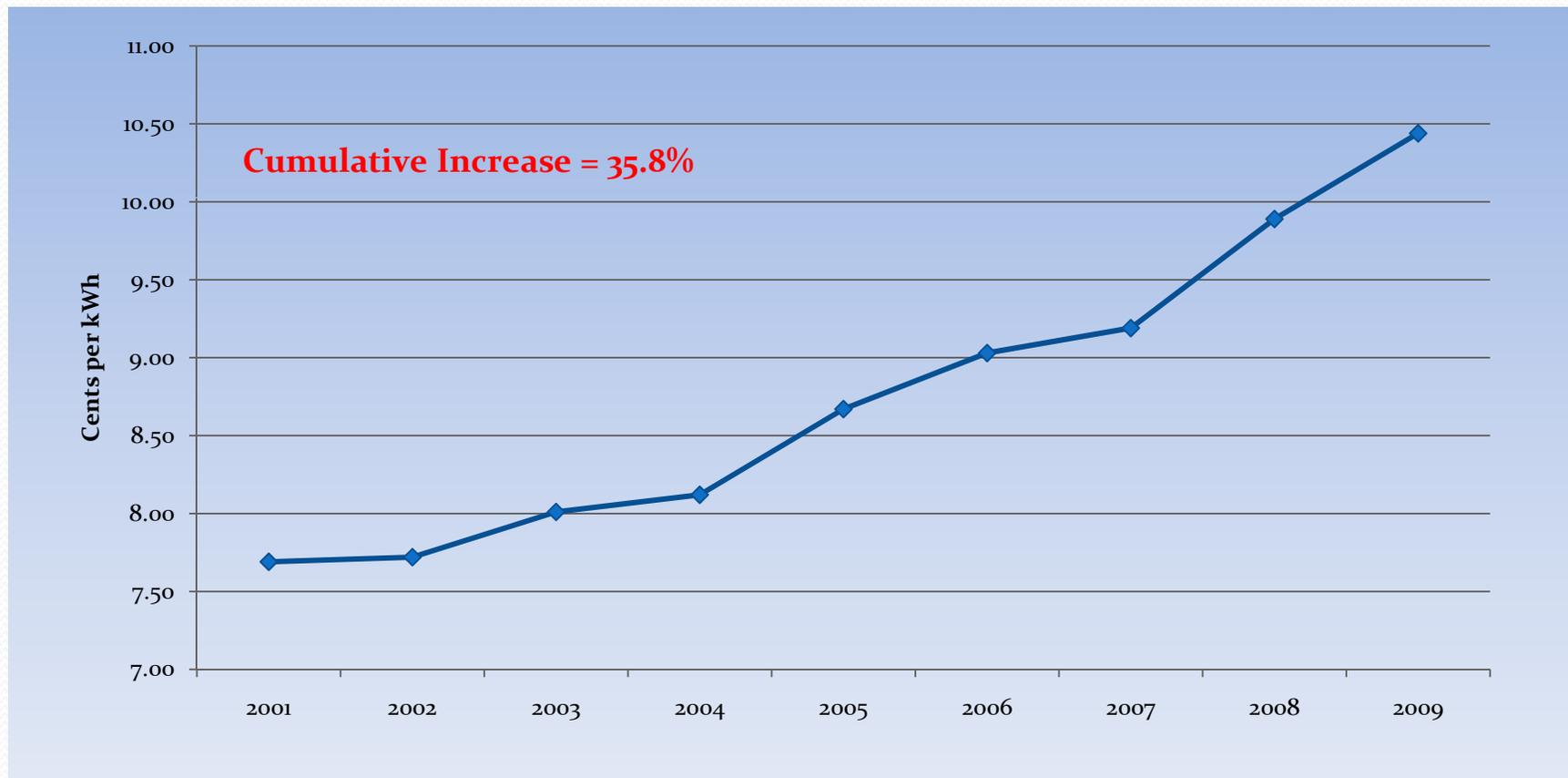
- Customer electric rates nationwide and in South Carolina have increased over the past few years (particularly since 2004 in SC) primarily due to substantial fuel cost increases:
  - General rate cases have been relatively limited as only a few utilities have added base load capacity;
  - Since fuel cost increases are generally passed through to customers based on kWh usage, these increases have had a predominantly greater impact on industrial customers; and
  - The following annual revenue/kWh graphs are from the US Energy Information Administration for all SC utilities on a composite basis and illustrate rate trends.

# South Carolina Annual Average Electric Revenue from the Industrial Sector



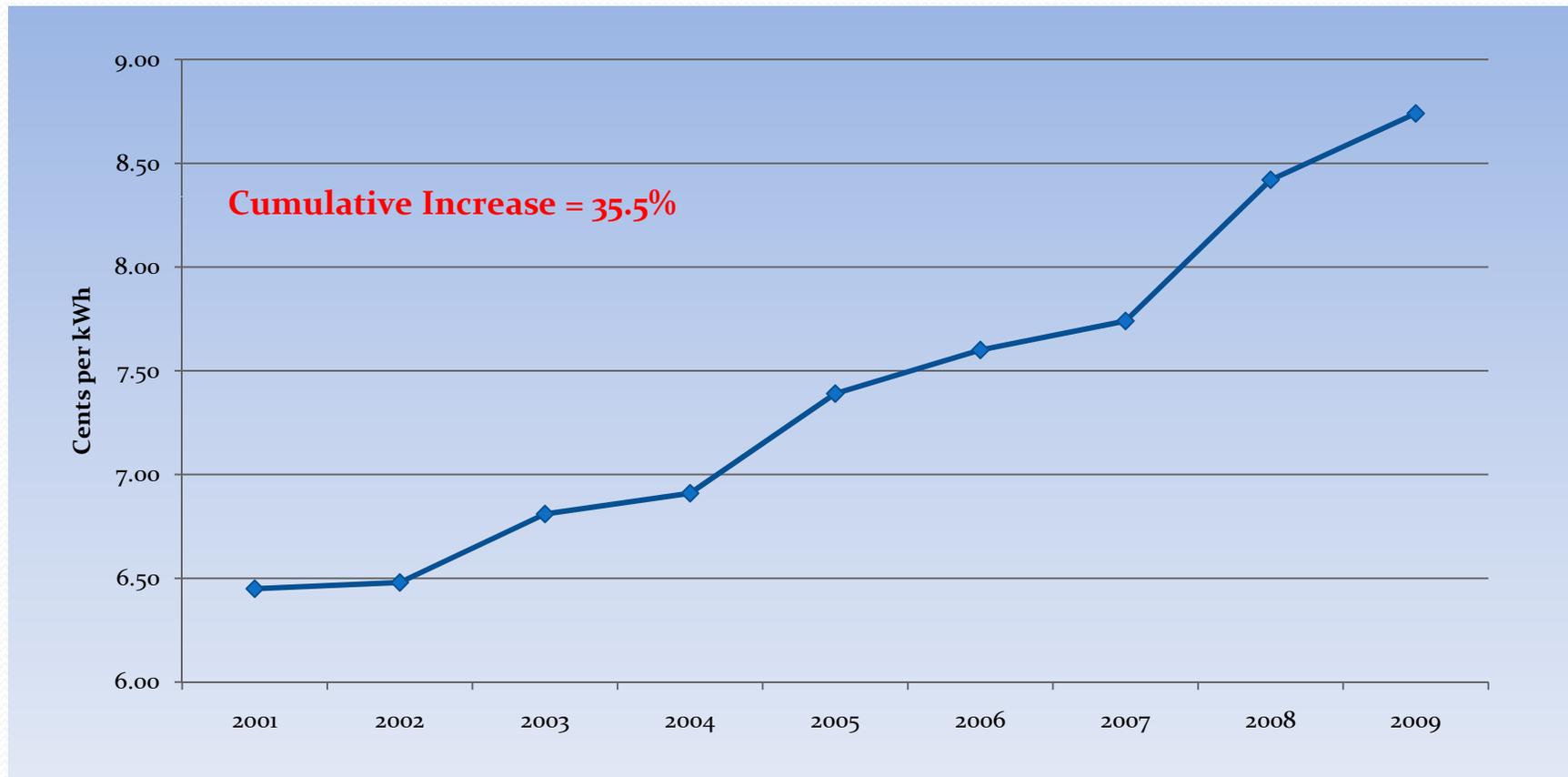
Source: EIA Electric Power Annual 2001-2009, Figures 7.5-7.7 See [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html) and <http://www.eia.doe.gov/cneaf/electricity/epa/backissues.html>.

# South Carolina Annual Average Electric Revenue from the Residential Sector



Source: EIA Electric Power Annual 2001-2009, Figures 7.5-7.7 See [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html) and <http://www.eia.doe.gov/cneaf/electricity/epa/backissues.html>.

# South Carolina Annual Average Electric Revenue from the Commercial Sector



Source: EIA Electric Power Annual 2001-2009, Figures 7.5-7.7 See [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html) and <http://www.eia.doe.gov/cneaf/electricity/epa/backissues.html>.



# Utility Rate Issues

- Revenue requirement
- Cost allocation and revenue spread
- Rate design
- Fuel and other pass-through costs



# Revenue Requirement

- We closely examine whether the utility's proposed revenue requirement is reasonable, recognizing that the utility has the burden of proof; for example, as we see it:
  - Expenses must be reasonable, necessary to provide utility service, recurring and timely, based on a reasonable historical test year
  - The capital structure must be reasonable
  - The return on equity must be reasonable
  - Rate base investments must be timely, reasonable, necessary and used and useful in providing service



# Cost Allocation and Revenue Spread

- For the cost allocation and revenue spread to produce reasonable revenue requirements for the jurisdiction and individual customer classes, we think that:
  - Rates should reflect cost causation.
  - The cost allocation study, which determines the jurisdictional and class cost of service, must be reasonable (demand cost allocation is an important issue – in SC, this Commission has traditionally used a 1CP method).
  - Class relative rates of return, gradualism and rate impact, among other issues, should be appropriately used to determine the ultimate revenue required from each class.



# Rate Design and Actual Rates: Where the rubber meets the road ....

Ultimately, customers pay rates as set out in utility rate schedules.

Rate design presents the opportunity to incorporate concepts and offer options in rates that achieve customer acceptance, reflect cost causation and provide better price signals, and create the potential for operational, reliability, and economic development benefits.

Some examples are:

- Curtailable/Interruptible rates
- Time-of-use rates
- Real-time pricing
- Rate mechanisms that offer stability and are designed to appropriately recover fixed and variable costs in demand, energy and customer charges
- Rates designed to support economic development that both attract new customers, and retain and support existing industry



# The Value of Large Industrial Customers

- Provide economic development benefits by investing in their communities and the state
- Bring resources and expertise to utility regulatory proceedings
- Operate at a high load factor, resulting in a more efficient use of the utility system
- Use a large amount of energy off-peak, when costs are lower
- Connect to the system at much higher voltages, requiring less transmission and/or distribution facilities and causing less system energy losses
- Interrupt load to permit the utility to avoid generation and transmission capacity costs



THANK YOU.  
QUESTIONS?