

# Criterion 3 Bandwidths Using Synthetic Bootstrap

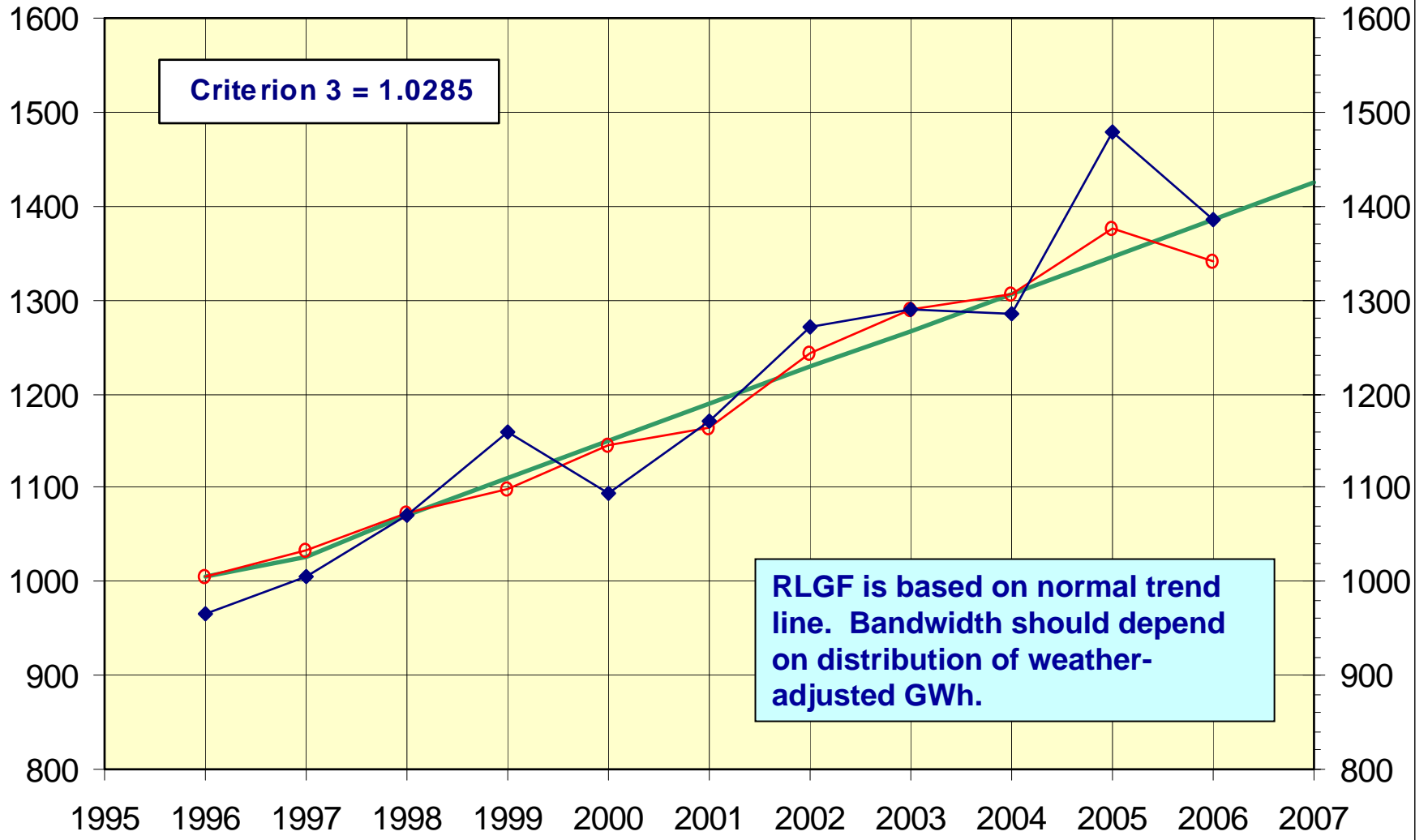
Load Forecast Task Force  
February 9, 2007

NYISO System & Resource Planning

# Summary

- Previously, Criterion 3 bandwidths were derived from the average of Criteria 1 & 2. It would be much better if Criterion 3 bandwidths were independent.
- But distribution of actual energy used in Criterion 3 is large & may be serially correlated.
- New approach uses synthetic boot strap based on uncorrelated series of RLGFs.
- Results: Some bandwidths increased, some decreased.

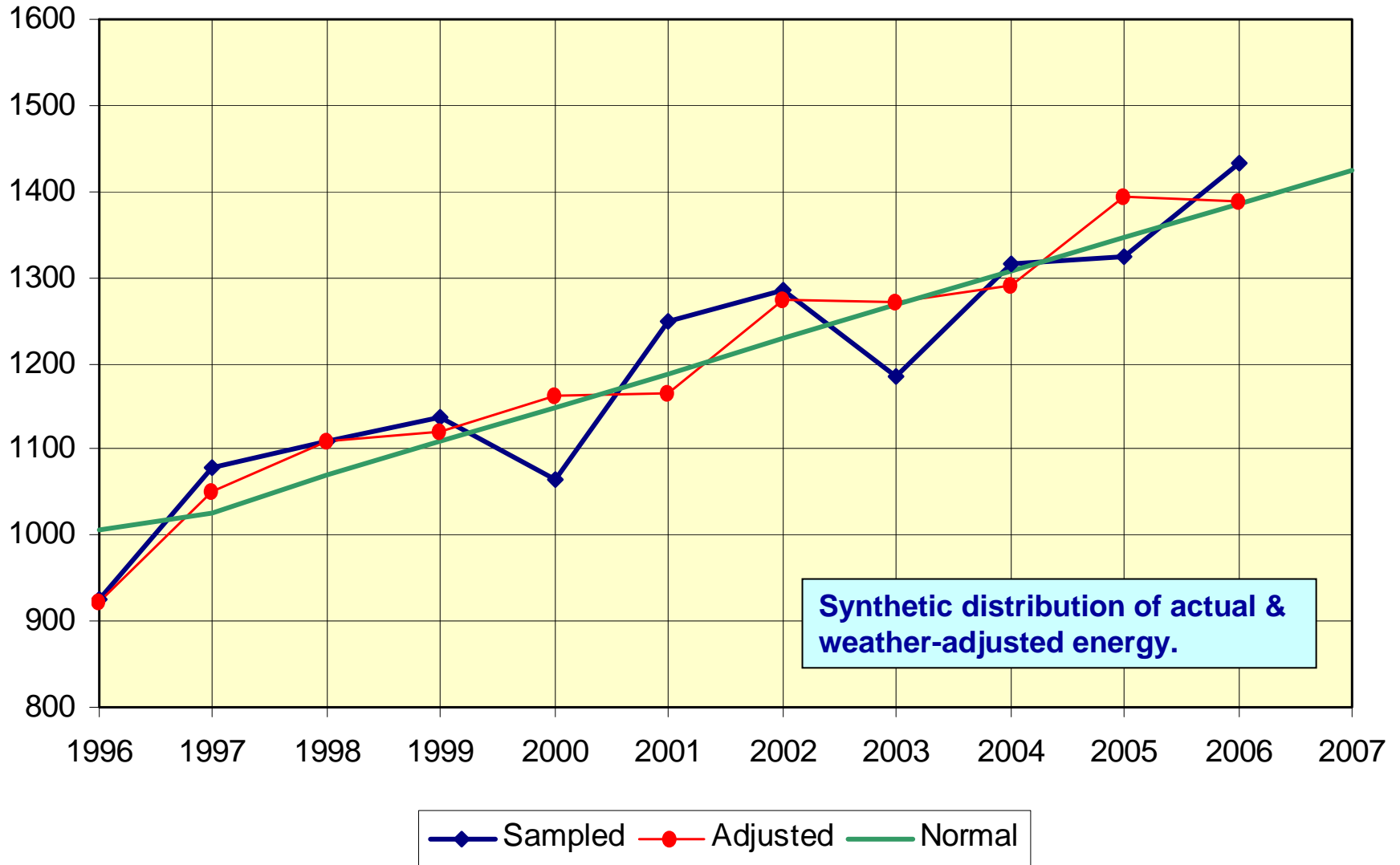
# O&R Weather-Adjusted Summer Energy - GWh



— Normal —○— Weather-Adjusted —◆— Actual GWh

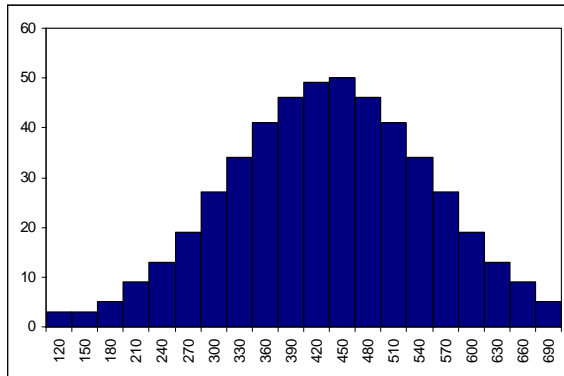
**Orange-Rockland**

## Normalized Energy Growth Synthetic Data

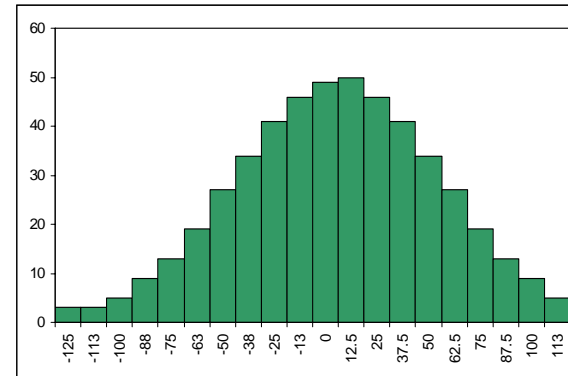


# Criterion 3 Equation of Summer Energy

$$\text{GWh} = \text{Constant} + \text{Trend} + \text{CDD Response} + \text{Model Error}$$



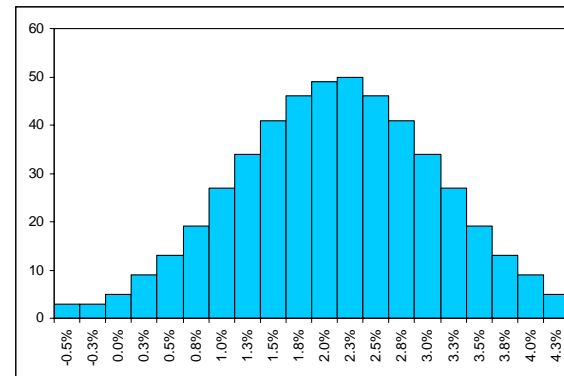
CDD Distribution



Model Error

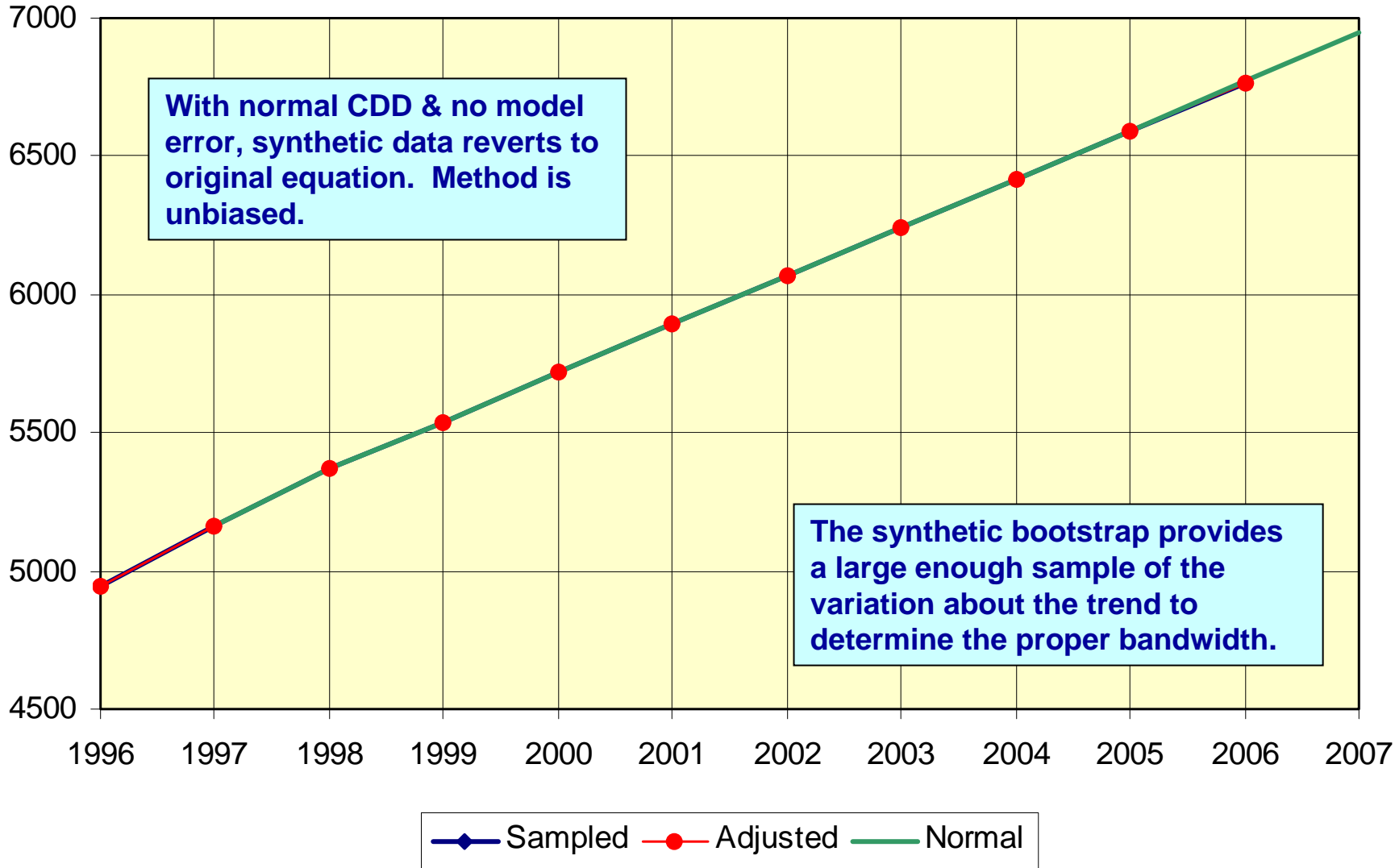
Implies...

Distribution of Weather-Adjusted Annual Load Growth



**Long Island P.A.**

## Normalized Energy Growth Synthetic Data

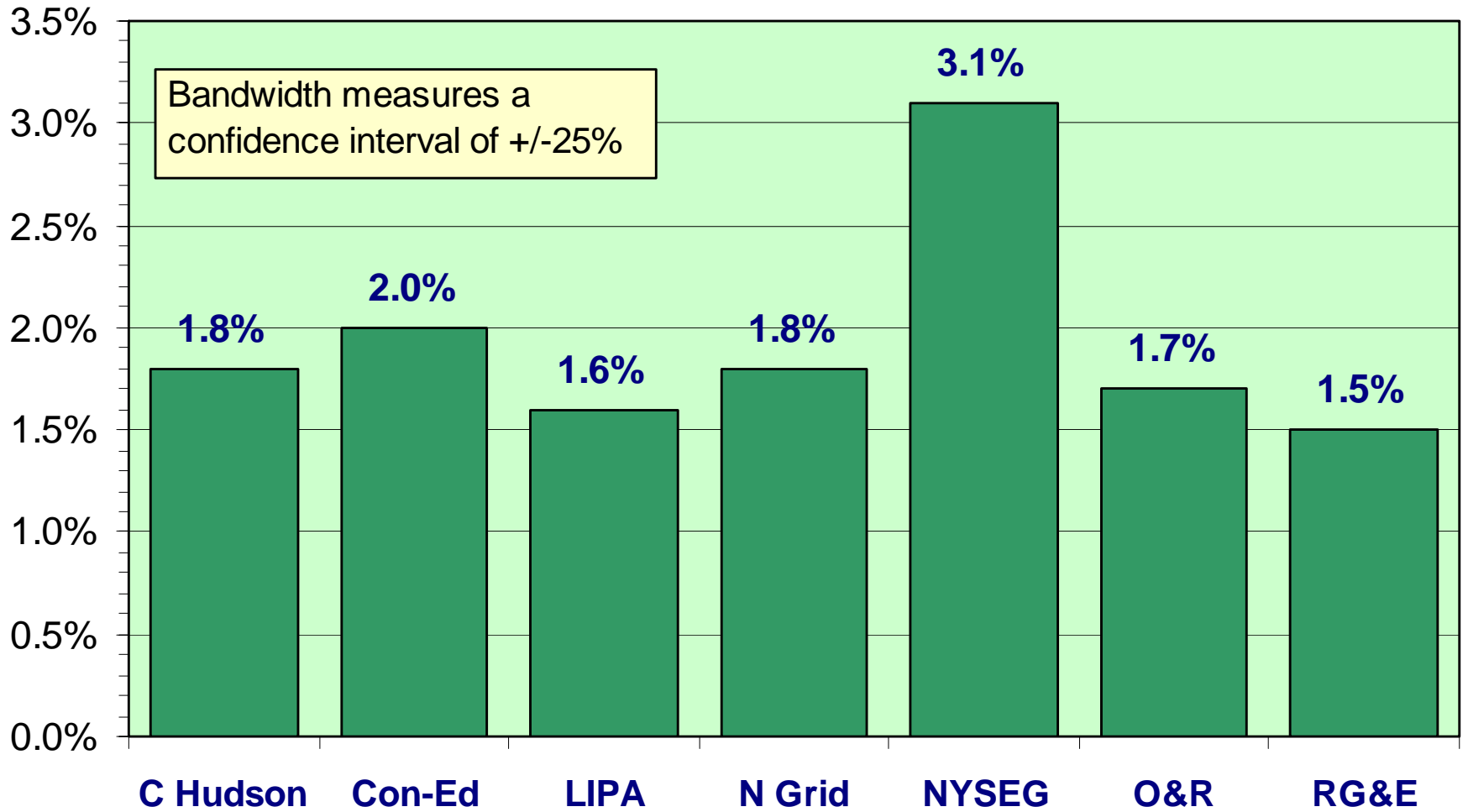


# The Synthetic Bootstrap

Original bootstrap method samples from actual data with replacement. Synthetic bootstrap samples from an infinite population having the same distribution. Otherwise methods are the same. Sample statistics will be accurate when sample is sufficiently large.

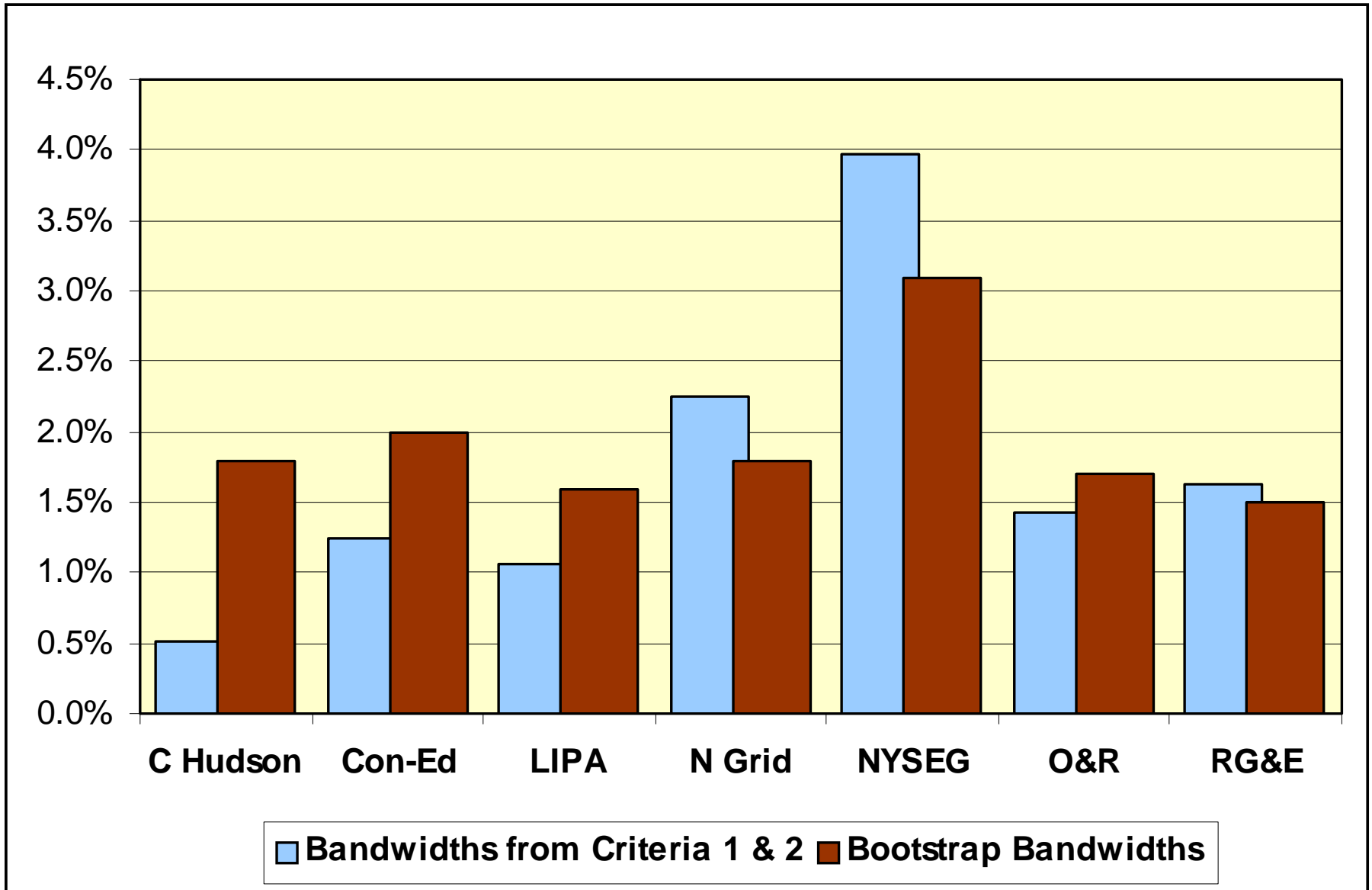
1. Make random draws of CDD & GWh model error (or noise). Use model equation to compute sampled GWh.
2. Weather-adjust sampled GWh for summer months.
3. Compute regional load growth factors of normalized energy from 1997 to 2006. Store results.
4. Repeat steps 1-3 several hundred times.
5. Examine distribution of RLGf's; 4,500 altogether.
6. Compute Criterion 3 Bandwidth based on +/-25% confidence interval.

## RLGF - Criterion 3 Bandwidths



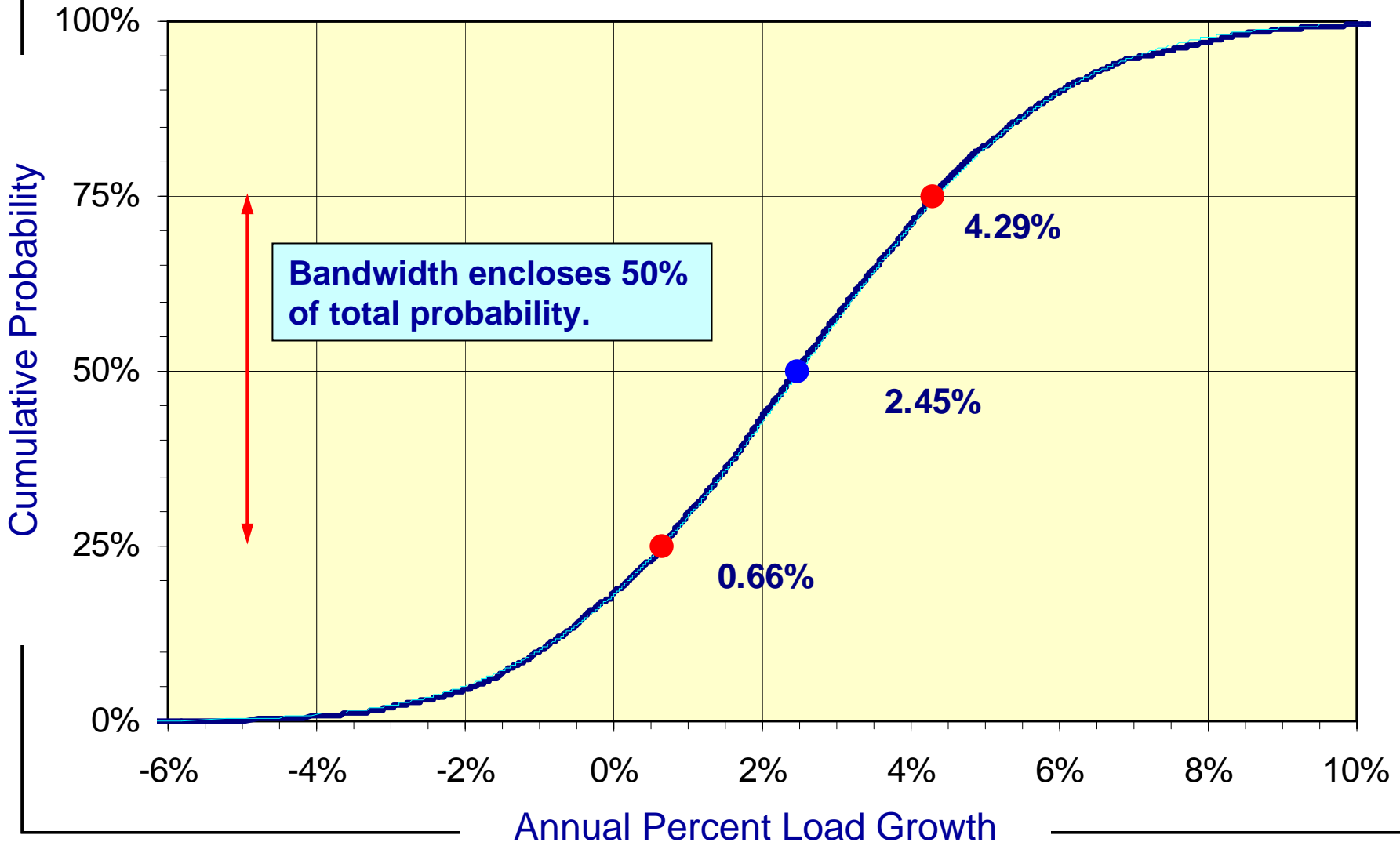


# Comparison to Original Bandwidths

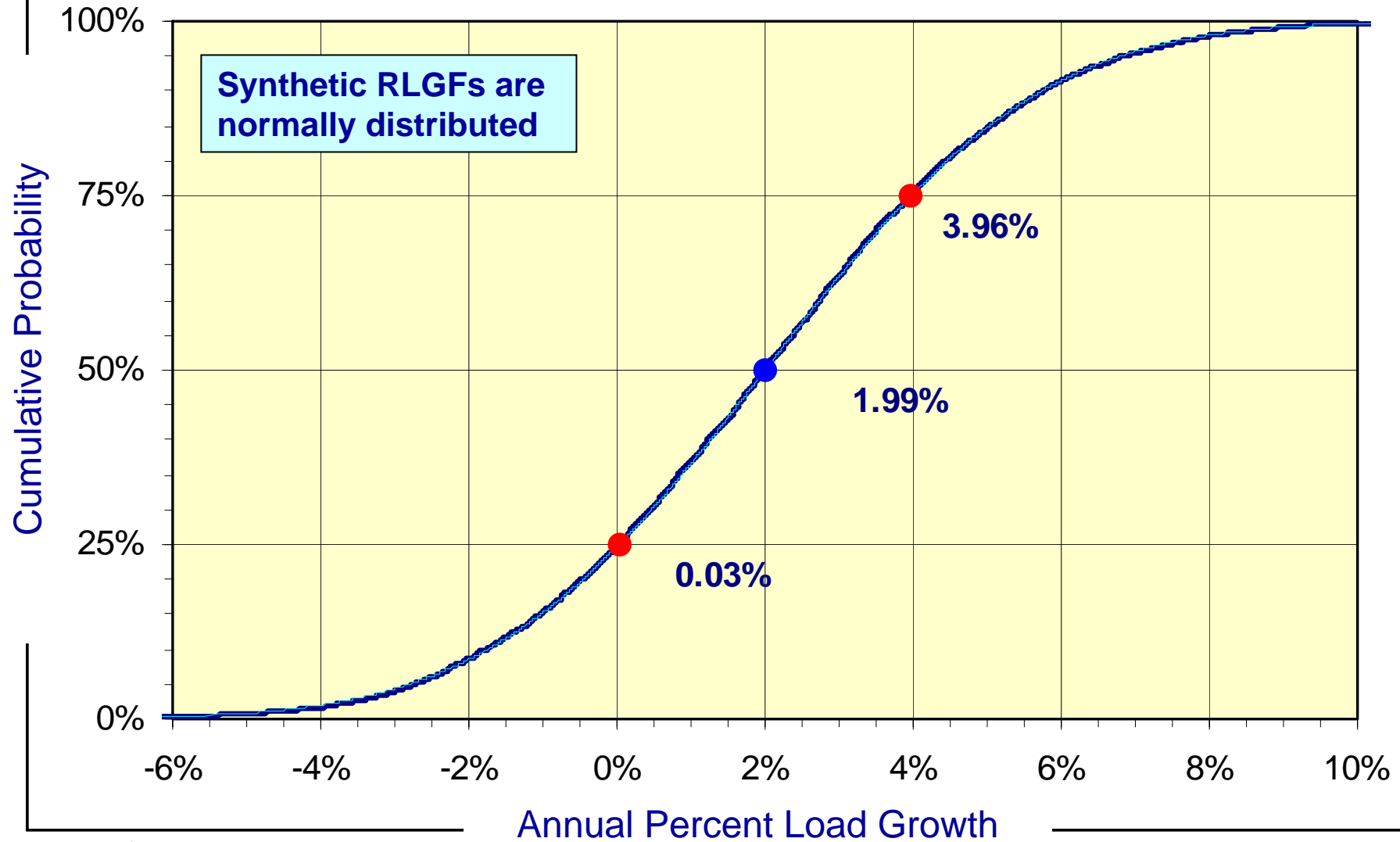


# RLGF Cumulative Distribution - Central Hudson

## Bandwidth Selection

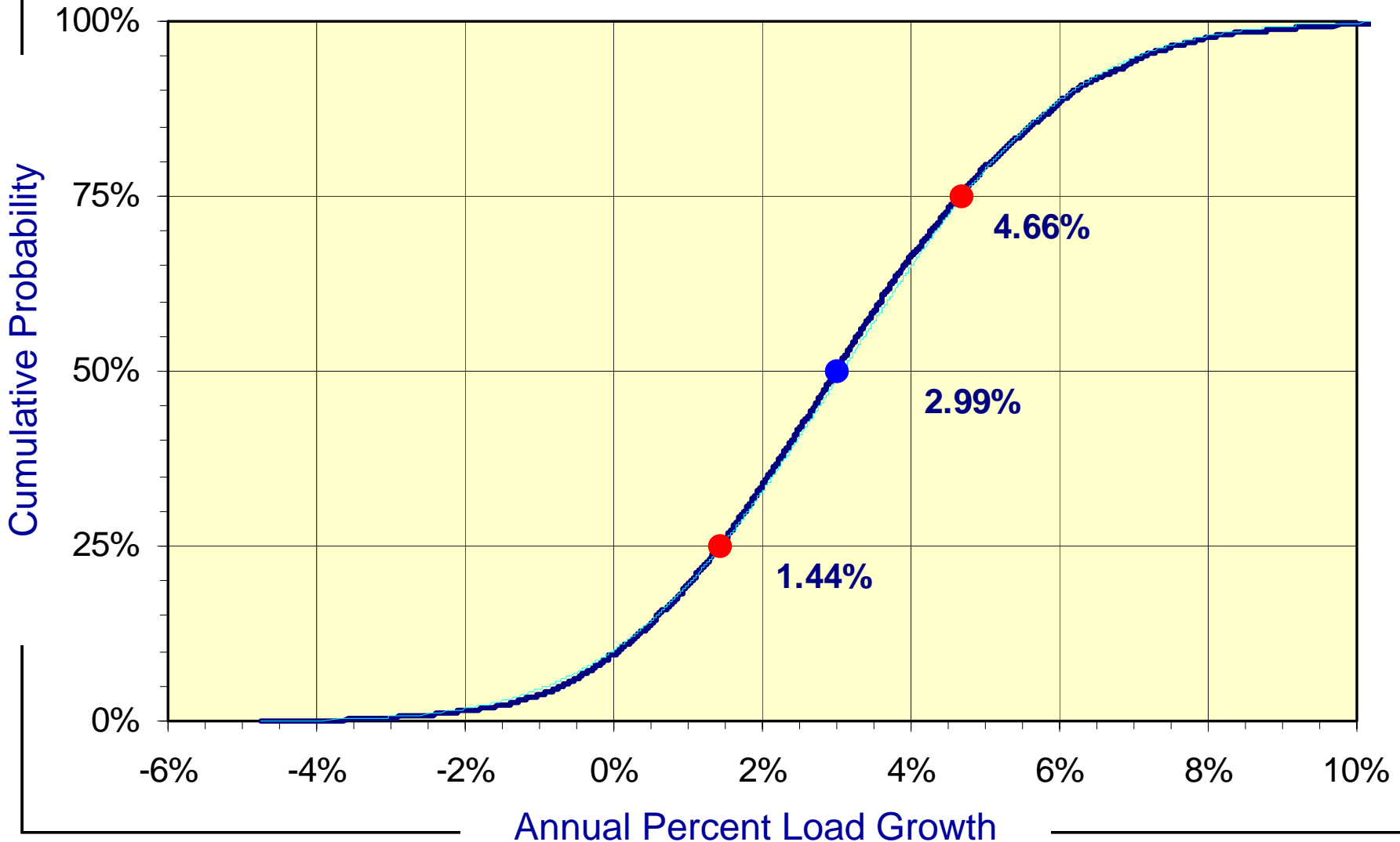


# RLGF Cumulative Distribution - Consolidated Edison Bandwidth Selection



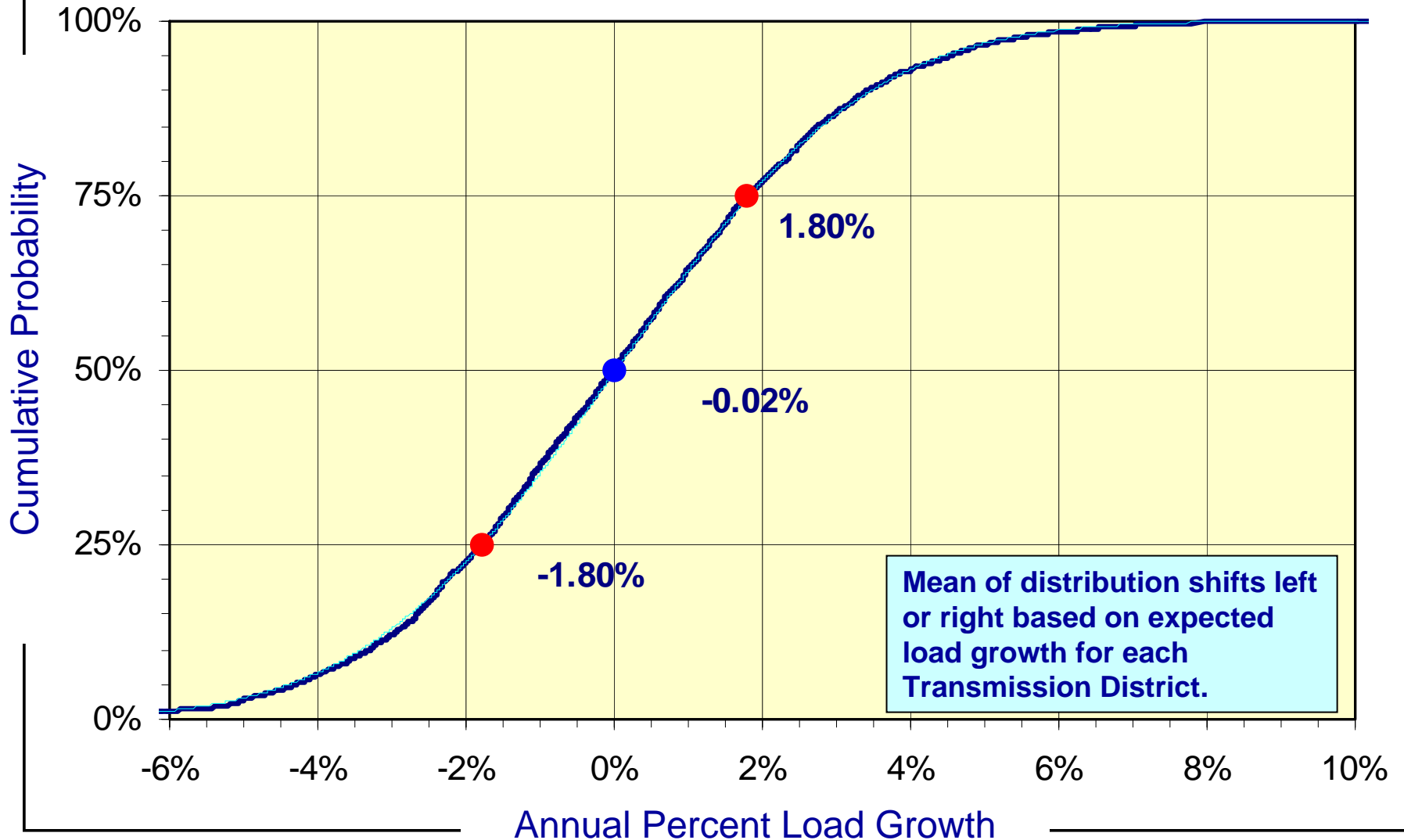
# RLGF Cumulative Distribution - Long Island PA

## Bandwidth Selection



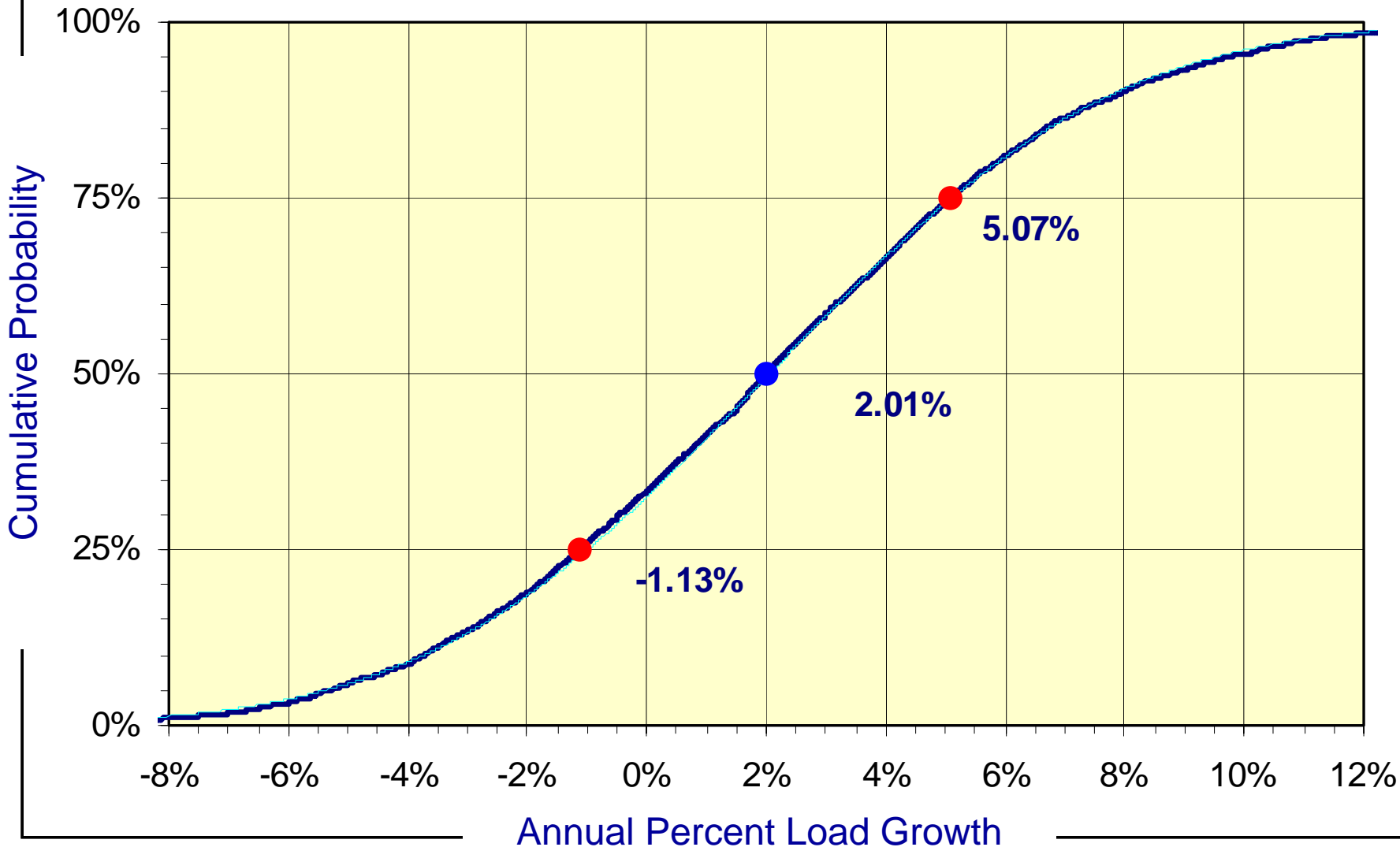
# RLGF Cumulative Distribution - National Grid

## Bandwidth Selection



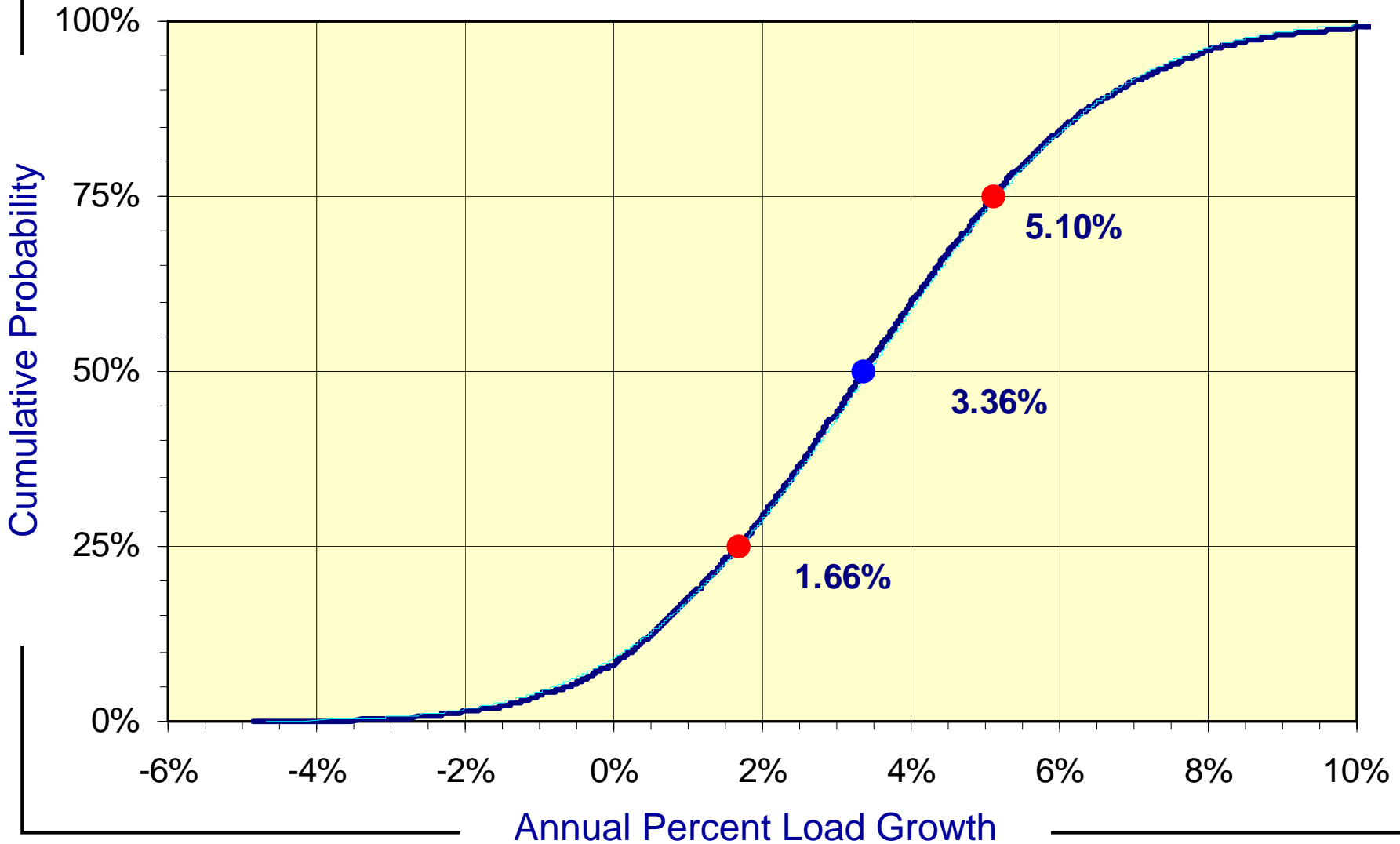
# RLGF Cumulative Distribution - New York State E&G

## Bandwidth Selection



# RLGF Cumulative Distribution - Orange & Rockland

## Bandwidth Selection



# RLGF Cumulative Distribution - Rochester G&E

## Bandwidth Selection

