# Benefit Cost Assumptions

***Presented to:***

***Illinois Energy Efficiency Stakeholder Advisory Group***

**June 12, 2024**

Nicor Gas

# Overview

- Overview of Benefit Cost Assumptions
- Statewide Assumptions/Approaches
- Nicor Gas-Specific Approaches

# Overview of Benefit Cost Assumptions

| | Scope | Electric | Gas |
|---|---|---|---|
| Avoided Energy Supply Costs | Statewide | ✓ | ✓ |
| Avoided Emissions Costs | Statewide | ✓ | ✓ |
| Avoided Transmission and Distribution Costs | Utility | ✓ | ✓ |
| Avoided Losses | Utility | ✓ | ✓ |
| Other Non-Energy Impacts | Statewide | ✓ | ✓ |
| Economic Inputs | Statewide | ✓ | ✓ |

# Avoided Energy Supply Costs

| | Electric | Gas |
|---|---|---|
| **What is it?** | Electricity supply costs for electricity delivered to utility customers<br>• Fuel/capital costs from changes in building/operating electric grid<br>• Energy costs<br>• Capacity costs<br>• $/MWh per change in grid output | Gas supply costs for gas delivered to utility customers<br>• Fuel costs for natural gas delivered to city gate<br>• Energy costs<br>• $/therm of change in gas throughput<br>• Perhaps also some capacity costs for wholesale transmission |
| **Approaches/ Assumptions/ Adjustments** | • Capacity expansion models (What gets built?)<br>• Grid simulation models (What gets operated?)<br>• Long-run marginal cost forecasts<br>• Short-run marginal costs forecasts | • Current commodity prices<br>• National commodity market forecasts<br>• Basis adjustments:<br>  • Delivery to utility city gates<br>  • Procurement/hedging strategies |
| **Sources** | • UDDOE/EIA Annual Energy Outlook<br>• USDOE/NREL Cambium dataset<br>• Other proprietary forecasts | • UDDOE/EIA Annual Energy Outlook<br>• Other proprietary forecasts |
| **Issues** | • Which source?<br>• Long-run vs. short-run marginal costs<br>• What is the “base case”?<br>• Shifting peak demand and load shapes<br>• Decrements (EE) vs. increments (electrification)<br>• How big a decrement/increment?<br>• Consistency (emissions, gas supply, inflation)<br>• Overall market vs. individual customer contracts | • Consistency (electric supply, inflation)<br>• Overall market vs. individual customer contracts |

# Avoided Emissions Costs

| | Electric | Gas |
|---|---|---|
| **What is it?** | Costs associated with electric generation combustion emissions<br>• Emissions from changes in building/operating electric grid (kg/MWh)<br>• Damage associated with emissions ($/kg)<br>• $/MWh per change in grid output | Costs associated with gas end use combust emissions<br>• Emissions from changes combusted gas (kg/therm)<br>• Damage associated with emissions ($/kg)<br>• $/therm per change in grid throughput |
| **Approaches/ Assumptions/ Adjustments** | • Marginal emissions from same approaches used to estimate electric supply costs<br>• Or from EPA AVERT model<br>• Social cost of GHG<br>• Social cost of criteria pollutants | • EPA gas combustion emission factors<br>• Social cost of GHG<br>• Social cost of criteria pollutants |
| **Sources** | • UDDOE/EIA Annual Energy Outlook<br>• USDOE/NREL Cambium dataset<br>• USEPA AVERT model<br>• USEPA (Social Cost of Carbon)<br>• USEPA (COBRA model) | • USEPA (Social Cost of Carbon)<br>• USEPA (COBRA model) |
| **Issues** | • Same issues as electric supply costs<br>• CO2 vs. other greenhouse gases<br>• Direct vs. upstream emissions<br>• Discount rate for future harm from current emissions<br>• Consistency (supply costs; GHG/criteria; inflation) | • CO2 vs. other greenhouse gases<br>• Direct vs. upstream emissions<br>• Discount rate for future harm from current emissions<br>• Consistency (GHG/criteria emissions; inflation) |

# Avoided Transmission & Distribution Costs

| | Electric | Gas |
|---|---|---|
| **What is it?** | Costs for the transmission & distribution required to deliver electric supply to customers<br>• Capacity costs<br>• $/kW/year per change in grid demand | Costs for the transmission & distribution required to deliver gas supply to customers<br>• Capacity costs<br>• $/peak-day therm/year per change in grid demand<br>• May be expressed as $/therm |
| **Approaches/ Assumptions/ Adjustments** | • Utility specific engineering/economic studies<br>• Electric grid plans | • Utility cost of service studies<br>• Utility specific engineering/economic studies |
| **Sources** | • Utility specific engineering/economic studies | • Utility rate cases<br>• Engineering staff input |
| **Issues** | • Which costs are avoidable?<br>• Decrements (EE) vs. increments (electrification)<br>• Consistency (inflation)<br>• Double counting issues with wholesale transmission | • Embedded vs. marginal costs<br>• Which costs are avoidable with lower throughput?<br>• Cost per therm vs. cost per peak-day therm<br>• Consistency (inflation)<br>• Double counting issues with wholesale transmission |

# Avoided Losses

| | Electric | Gas |
|---|---|---|
| **What is it?** | Losses incurred in transmitting & distributing electricity to customers<br>• % of generated (or delivered) energy<br>• % of generated (or delivered) demand | Losses incurred in transmitting & distributing gas to customers<br>• % of purchased (or delivered) energy |
| **Approaches/ Assumptions/ Adjustments** | • Utility specific engineering/economic studies<br>• Electric grid plans | • Utility cost of service studies<br>• Utility specific engineering input |
| **Sources** | • Utility specific engineering/economic studies | • Utility rate cases<br>• Engineering staff input |
| **Issues** | • Average vs. marginal losses<br>• Losses by time period (or end use load shape) | • Which losses are avoidable with lower throughput?<br>• Double counting issues with wholesale transmission vs. supply |

# Other Non-Energy Impacts

| | Water Savings | Health Benefits | O&M Costs |
|---|---|---|---|
| **What is it?** | Other quantifiable costs or benefits from energy efficiency measures/programs/portfolios<br>• Water savings (showerheads and other water savings measures)<br>• Health benefits (low income weatherization)<br>• Avoided/increased O&M costs (specific measures, usually business measures)<br>• Others | | |
| **Approaches/ Assumptions/ Adjustments** | • Water savings (gallons/year)<br>• Utility rates ($/gallon) | • Program specific | • Measure specific |
| **Sources** | • IL-TRM calculates water savings<br>• Local water utility rates | • Joint evaluator studies on health impacts of weatherization programs | • IL-TRM calculates O&M impacts for some specific measures |
| **Issues** | • Forecast of future water rates | | |

# Economic Inputs

| | Discount Rate | Inflation |
|---|---|---|
| **What is it?** | • Rate for discounting future costs/benefits to evaluate lifecycle cost effectiveness for measures/programs/ portfolios | Projection of changes in costs over and above real price changes<br>• Labor<br>• Other costs |
| **Approaches/ Assumptions/ Adjustments** | • TRC: societal discount rate, per EE Policy Manual<br>  • Risk free investment return<br>• UC/RIM (if applicable):<br>  • Utility weighted average cost of capital | • Social cost of GHG<br>• Social cost of criteria pollutants |
| **Sources** | • US Treasury Bond Yields<br>• Academic analyses of “risk free” returns<br>• Utility rate cases | • UDDOE/EIA Annual Energy Outlook<br>• USDOE/NREL Cambium dataset<br>• Other proprietary forecasts<br>• Utility corporate planning/Treasury |
| **Issues** | • Covid-driven monetary policy skews recent Treasury Bond rates<br>• Historic vs. projected rates<br>• Consistency between discount rate and inflation<br>• Consistency with other forecasts | • Consistency between discount rate and inflation<br>• Consistency with other forecasts |

# Next Steps

- Working group to finalize approaches in next few weeks
- Review with broader SAG in July?
- Other action items?