

The Value of Using Coal Gasification as a Long-Term Natural Gas Hedge

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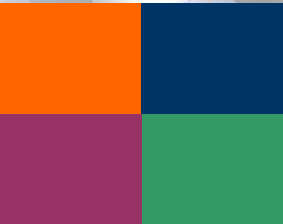
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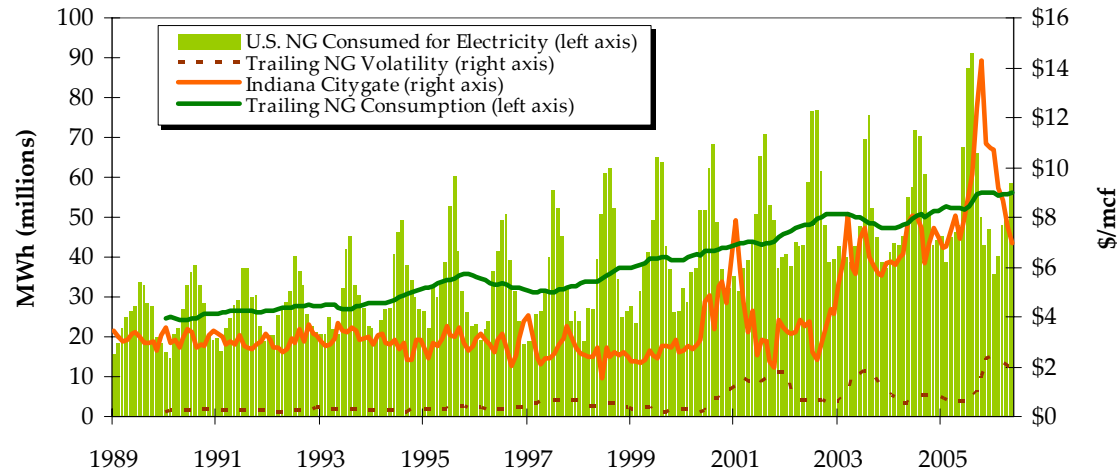
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- The results outlined in this presentation are preliminary and subject to change. The model was designed to reflect contractual conditions *as proposed*. Actual contractual terms may be different than those illustrated here and may significantly change the modeling results.
- DAI and Carnegie Mellon University accept no responsibility for the contractual and/or engineering provisions of this project. We are not rendering an opinion on either the technical or financial feasibility of this project. All of the technical and contractual parameters relied upon by DAI and Carnegie Mellon University have been provided by Black & Veatch, E³, and/or TX Energy.



Introduction and Modeling Process



A Shifting Foundation




- DEMAND IS UP: Electric power demand for natural gas has soared in the last 10 years
- PRICES ARE UP: As a result, natural gas prices have tripled from earlier levels
- RISK IS UP: Natural gas price volatility has climbed as well

Coal Gasification as a Potential Solution

- The Proposed Project
 - 3 operating + 1 spare GE Radiant gasifiers located in SW Indiana
 - Project will produce 40 BCF/year of SNG (38.8 million MMBtu or about 20% of Indiana's residential and commercial demand) at steady-state availability + 134 MW of electricity from waste heat
 - The project is currently examining options for carbon sequestration
 - The project will employ the "3 Party Covenant"
 - Federal loan guarantee to use 80% debt/capital
 - Long-term regulatory commitment with no look-back
 - Long-term contract with gas utilities

- The analysis sought to compare two options from the ratepayers' perspective:
 - Option #1: Status Quo
 - Procure demand at the competitive market price
 - Competitive market price assumed to be AEO Forecast of Henry Hub wellhead *plus* an adder reflecting the additional costs to obtain Indiana Citygate gas
 - Option #2: SNG Mix
 - Purchase all of SNG Project's output at the proposed contract price up to contract-specified threshold
 - Purchase all remaining unmet demand at competitive market price
 - Competitive market price assumed to be the same as in Option #1

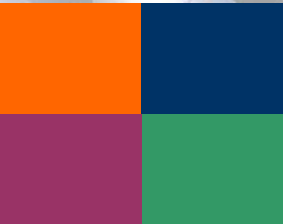
Savings to Ratepayers

- If the cost of Option #2 is less than Option #1, then ratepayers are saving money as a result of the SNG project
- If the cost of Option #2 is more than Option #1, then ratepayers are incurring additional costs as a result of the SNG project
- The analysis measures the difference (Option #1 minus #2) on a yearly, as well as discounted present value basis
 - $\text{Option \#1} - \text{Option \#2} = \text{Savings to ratepayers}$
- Barriers to acceptance of gasification include utility and regulator acceptance given technological risks and uncertainty surrounding future benefits (as with any high fixed cost, low variable cost project)
-  Our analysis is novel because we take the consumers' perspective in identifying three different sources of value:
 - Cost Savings
 - Risk-Reduction Value
 - Diversification Value
- To be clear: consumers here are benefiting from a contractual arrangement surrounding the project, not just the economics of the project itself.

- Simulation Model
 - Measure the value/cost of the *status quo* and SNG options to ratepayers in a manner that incorporates key sources of uncertainty
- Utility Theory
 - Measure the risks of the *status quo* and SNG options and assess the value to ratepayers of a reduction in uncertainty
- Portfolio Optimization
 - Using the conclusions about value and risk, determine the optimal balance of natural gas and SNG in Indiana's gas supply portfolio



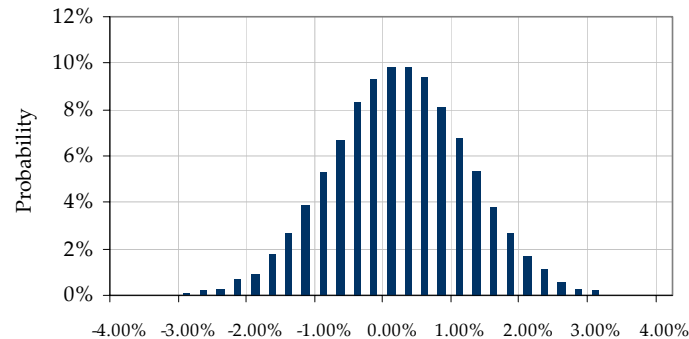
Input Parameters



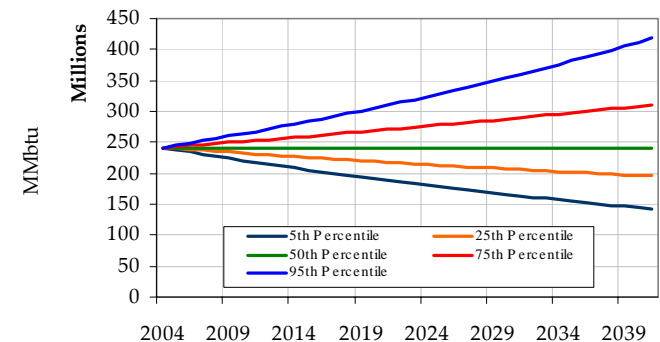
Input Parameters

- Demand
 - *Inflation*
 - Henry Hub Natural Gas Price Forecast
 - *Henry Hub-to-Indiana Citygate Adder*
 - *Discount Rate*
 - Availability
 - Correlation and Serial Correlation
- ➡ Italicized entries are not reviewed here

Average Demand Growth Rate



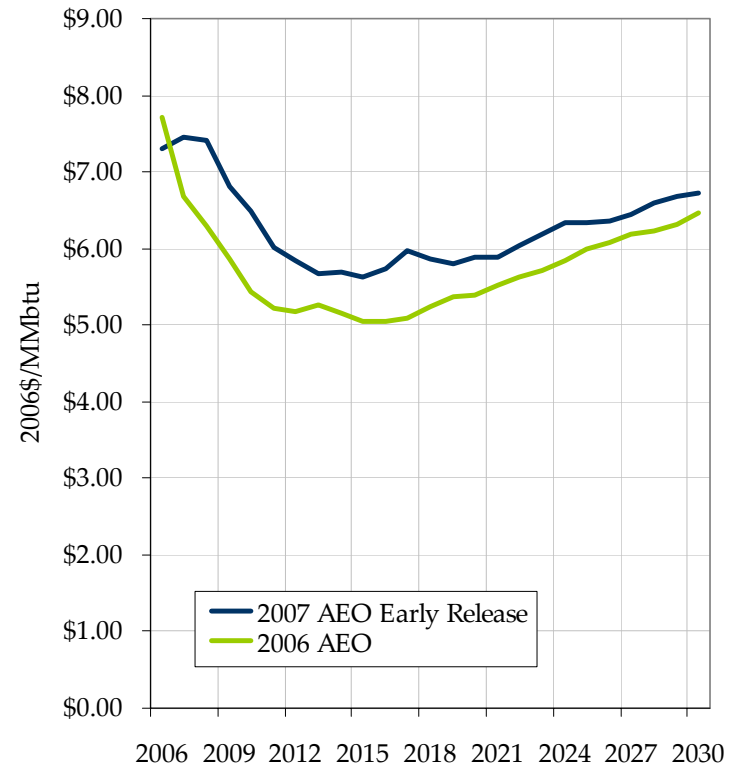
Indiana State Residential and Commercial Demand



- Total starting demand is 192 million MMBtu/year
- Demand growth for each market was assumed to be normally distributed with a zero mean and a standard deviation of 1%
 - Median scenario is no demand growth for life of the project
 - Because the project only accounts for <15% of state residential and commercial gas heating demand, demand is not a significant influence on the project's value
- Demand growth rates between each utility and rate class were correlated at 0.88 based on historical data (state-level residential and commercial growth rates from 1999-2004)
 - Source: Energy Information Administration, U.S. DOE

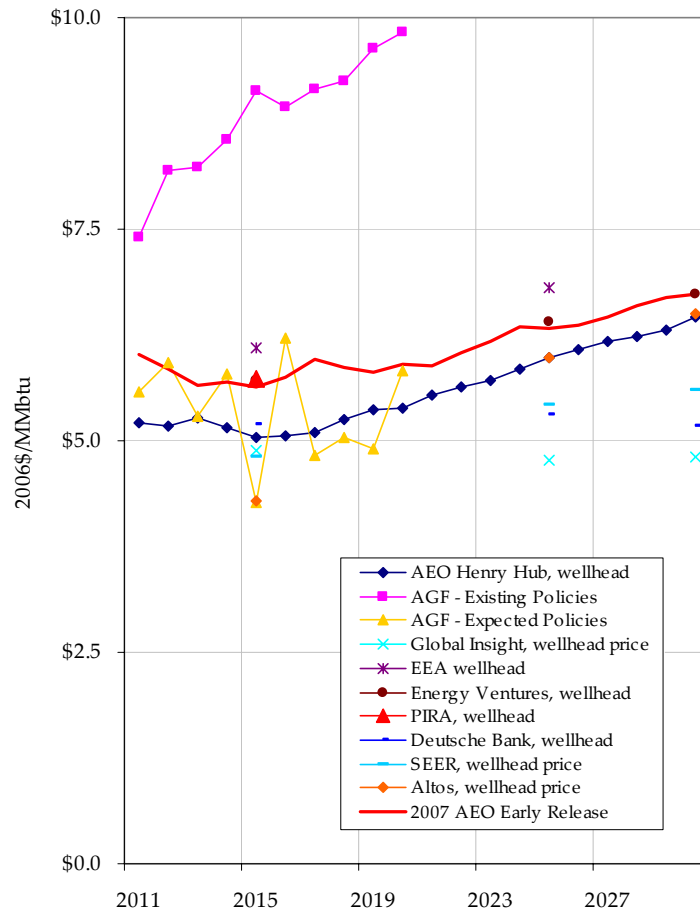
AEO Natural Gas Forecast

- DAI's analysis relies on the Dept. of Energy's *Annual Energy Outlook* (AEO) forecast of natural gas prices
- AEO forecast is of Henry Hub wellhead prices
- Comparison price is based on Henry Hub wellhead + a Citygate adder
- AEO was used because a long time series of forecast performance is available
- AEO forecasts end in 2030. After this point, DAI assumed prices remained constant in real dollars at the 2030 level for the remainder of the project (2041).



Source: 2006 AEO, U.S. DOE,
2007 AEO Early Release

AEO Forecast Comparison



- Although DAI used the AEO forecast because of the historical forecast accuracy data available with it, several other long-term forecasts were available
- These forecasts are broadly consistent in two ways:
 - Absolute level
 - “Spread” (uncertainty)

Sources: 2006 AEO, American Gas Foundation Existing and Expected Policies Scenarios, Global Insight Summer 2005 U.S. Energy Outlook (August 2005), Energy and Environmental Analysis Compass Service Base Case (October 2005), Energy Ventures FUELCAS: Long Term Outlook (August 2005), PIRA Energy Group (October 2005), Deutsche Bank (October 2005), Strategic Energy and Economic Research 2005 Energy Outlook (October 2005), Altos Partners North American Regional Gas Model Long-Term Base Case (October 2005), 2007 AEO Early Release

AEO Forecast Error

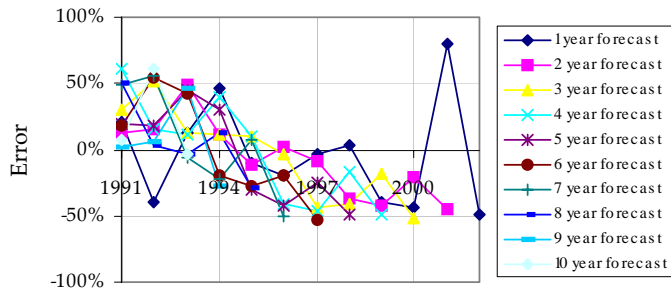
- The value of the AEO is in its 20+ year history of published forecasting performance
- The EIA/DOE formally analyzes the AEO's forecasting performance *and* publishes the results
- Historically, AEO forecasts have followed a cyclical pattern of over-estimation followed by under-estimation. On average, over long periods of time, the AEO's forecasting performance (for natural gas) has been good, although subject to high volatility and strong serial correlation
- The data illustrate that, because of this cyclical component, there is very little difference between the accuracy of short-term and long-term forecasts *on average*.
- The standard deviation of forecast errors remains ~35% whether talking about 1-year or 10-year forecasts
- Based on the AEO's forecasting performance since 1991, DAI estimated the following parameters to incorporate forecast uncertainty:
 - Normally distributed errors with a mean of -0.7% and a standard deviation of 34.2%
 - Serial correlation of 0.75 (*i.e.*, correlation from year to year)

AEO Forecast Error

Forecast Horizon (years forward)

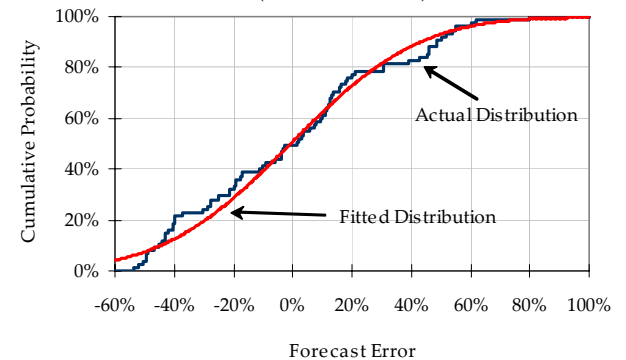
	1	2	3	4	5	6	7	8	9	10
1991	21.3%	12.8%	30.6%	61.7%	19.9%	17.9%	48.5%	50.2%	1.8%	7.8%
1992	-40.0%	16.1%	51.6%	15.7%	18.2%	53.7%	55.1%	3.5%	5.9%	60.5%
1993	13.0%	48.5%	12.4%	12.0%	45.2%	42.7%	-5.8%	-3.9%	45.9%	-3.4%
1994	46.2%	11.0%	11.5%	39.2%	30.4%	-19.0%	-21.5%	13.4%	-27.9%	
1995	-10.0%	-11.0%	9.8%	9.6%	-30.2%	-27.6%	7.1%	-28.6%		
1996	-19.7%	1.6%	-3.9%	-40.4%	-42.8%	-19.4%	-50.3%			
1997	-2.8%	-9.2%	-43.9%	-46.6%	-25.0%	-53.5%				
1998	3.0%	-37.2%	-40.5%	-17.1%	-49.5%					
1999	-40.1%	-42.1%	-17.8%	-49.2%						
2000	-43.3%	-21.4%	-51.9%							
2001	80.0%	-45.0%								
2002	-49.1%									
Average	-3.5%	-6.9%	-4.2%	-1.7%	-4.2%	-0.7%	5.5%	6.9%	6.4%	21.6%
Std Dev	39.3%	28.7%	34.0%	39.2%	36.6%	39.5%	40.7%	28.7%	30.3%	34.1%

Accuracy Cycles

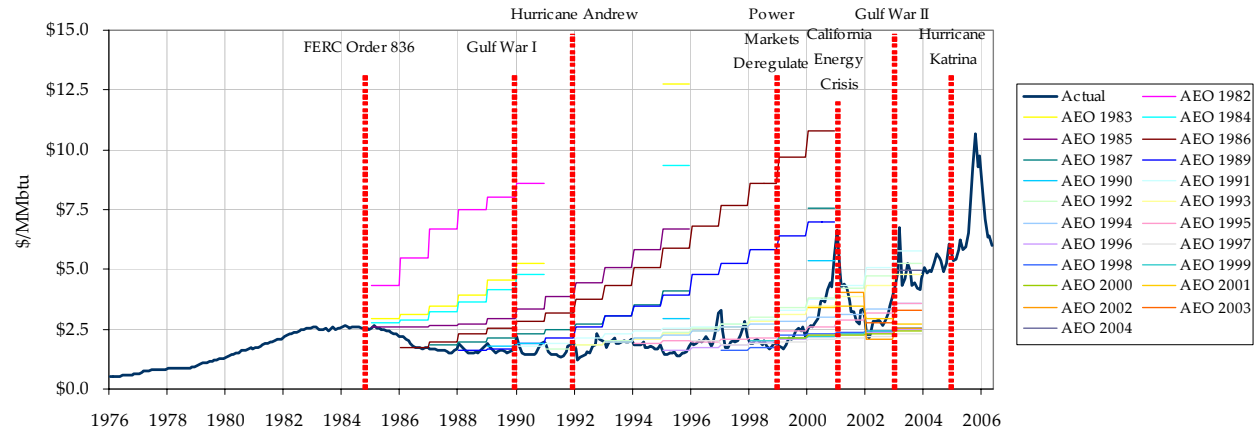


Year of Forecast

Probability Distribution Fit to Historical Accuracy Data
Normal(-0.0073733, 0.34159)



Why Forecast Error?



- Forecasts are meant to reflect fundamental, “predictable” factors
- Extreme events can cause future prices to deviate from forecasts simply because those events were not anticipated by the forecasters
- Such events can include extreme weather events, political events, regulatory events, macroeconomic factors, technological breakthroughs, etc.
- The purpose of modeling forecast error uncertainty is to include the likely consequences of unpredictable events. The AEO historical performance data provides a unique window through which to examine deviations from actual prices resulting from events that were, at the time of the forecast, unknown and unpredictable.

- DAI's model relies on the probabilistic information about project availability provided by Black & Veatch
- The modeled configuration is "3+1"
 - 3 operating gasifiers
 - 1 spare gasifier

Black & Veatch Availability Estimates

Probability that a lower availability number is observed:

	0%	2%	20%	50%	80%	95%	100%	
Year 1	25%	N/A	50%	65%	80%	98%	100%	
Year 2	25%	N/A	60%	73%	85%	98%	100%	
Year 3	25%	60%	70%	80%	88%	98%	100%	
Year 4	25%	60%	80%	85%	90%	98%	100%	
Year 5	25%	60%	80%	83%	86%	98%	100%	Major Overhaul
Year 6	25%	60%	87%	90%	93%	98%	100%	
Year 7	25%	60%	87%	90%	93%	98%	100%	
Year 8	25%	60%	87%	90%	93%	98%	100%	
Year 9	25%	60%	87%	90%	93%	98%	100%	
Year 10	25%	60%	87%	90%	93%	98%	100%	
Year 11	25%	60%	85%	88%	91%	98%	100%	Major Overhaul
Year 12	25%	60%	87%	90%	93%	98%	100%	
Year 13	25%	60%	87%	90%	93%	98%	100%	
Year 14	25%	60%	87%	90%	93%	98%	100%	
Year 15	25%	60%	87%	90%	93%	98%	100%	
Year 16	25%	60%	87%	90%	93%	98%	100%	
Year 17	25%	60%	85%	88%	91%	98%	100%	Major Overhaul
Year 18	25%	60%	87%	90%	93%	98%	100%	
Year 19	25%	60%	87%	90%	93%	98%	100%	
Year 20	25%	60%	87%	90%	93%	98%	100%	
Year 21	25%	60%	87%	90%	93%	98%	100%	
Year 22	25%	60%	87%	90%	93%	98%	100%	
Year 23	25%	60%	85%	88%	91%	98%	100%	Major Overhaul
Year 24	25%	60%	87%	90%	93%	98%	100%	
Year 25	25%	60%	87%	90%	93%	98%	100%	
Year 26	25%	60%	87%	90%	93%	98%	100%	
Year 27	25%	60%	87%	90%	93%	98%	100%	
Year 28	25%	60%	87%	90%	93%	98%	100%	
Year 29	25%	60%	85%	88%	91%	98%	100%	Major Overhaul
Year 30	25%	60%	87%	90%	93%	98%	100%	

Availability

Sources: Black & Veatch Draft Availability Estimates (June 9, 2006)

SNG Contract Terms

- DAI's model is from the ratepayers' perspective and is based on proposed contract terms offered by TX Energy of \$6/MMbtu for SNG (in 2006\$, excluding debt service reserve adder)
- Pricing is based on 4 components:
 - Capital (~41%, no escalation)
 - Fuel (~40%, escalated at CPI)
 - O&M (~19%, escalated at CPI)
 - Debt Service Reserve Adder (\$0.10/MMbtu)

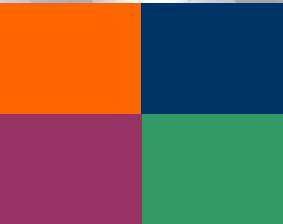
} No commodity risk transfer
- The proposed contract terms call for the O&M and fuel components to be indexed to general inflation
- The proposed contract terms include a provision for 50/50 profit sharing for all production over the base 40 BCF/year
- NB: Consumers do not bear commodity risk. They are, in effect, swapping a long-term floating commodity exposure for a long-term fixed-rate commodity exposure

Debt Service Reserve

- The project's credit support is complicated, but in general:
 - Ratepayers are liable for 75% of any shortfall in debt service costs (*e.g.*, from lower than planned availability) with an annual cap of \$0.10/MMbtu per year, with any excess shortfall accumulated and settled in future years
 - The \$0.10/MMbtu is accumulated in an account that earns interest, and any unused balance is refunded to ratepayers upon conclusions of the project



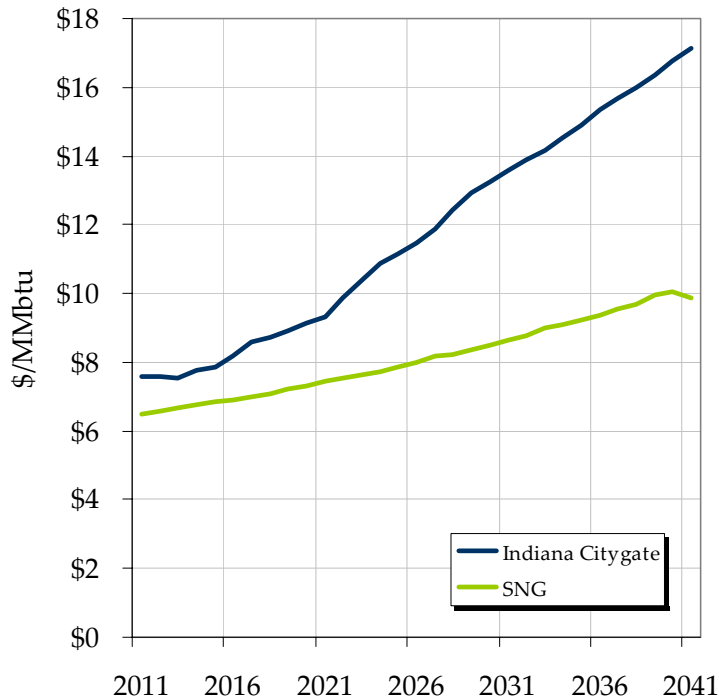
Simulation Model Output



Time Series of Prices: *Average Prices*

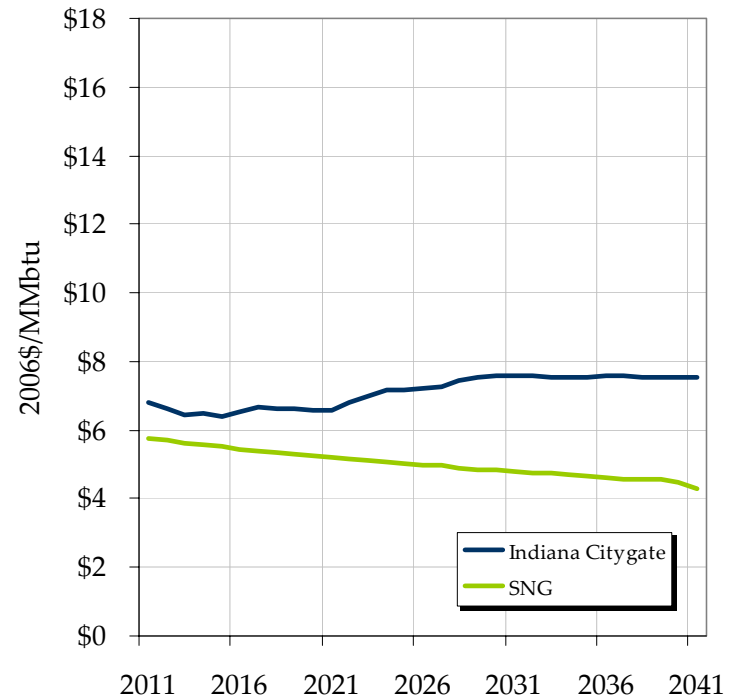


Nominal Dollars



Average Citygate Price = \$11.04
Average SNG Price = \$8.00

Real 2006 Dollars



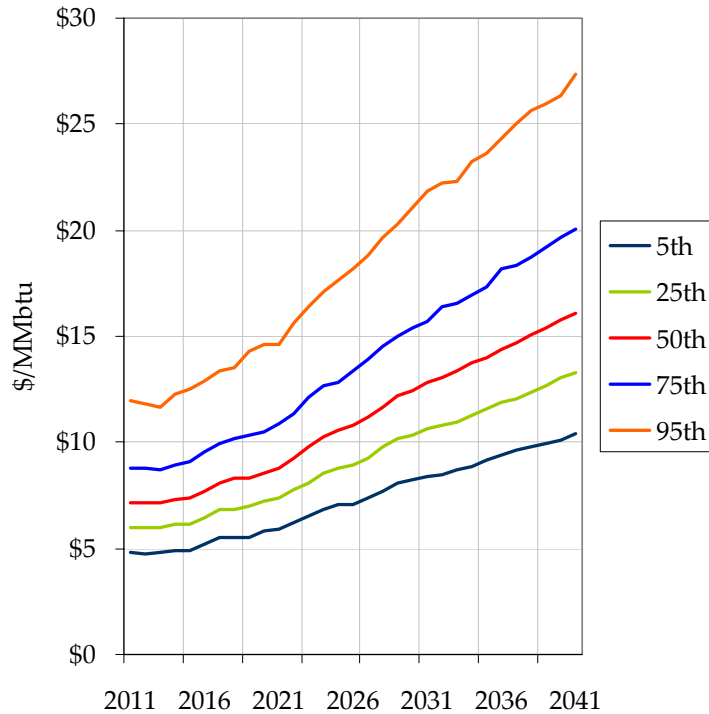
Average Citygate Price = \$7.12
Average SNG Price = \$5.03

SNG is ~30% less expensive than natural gas

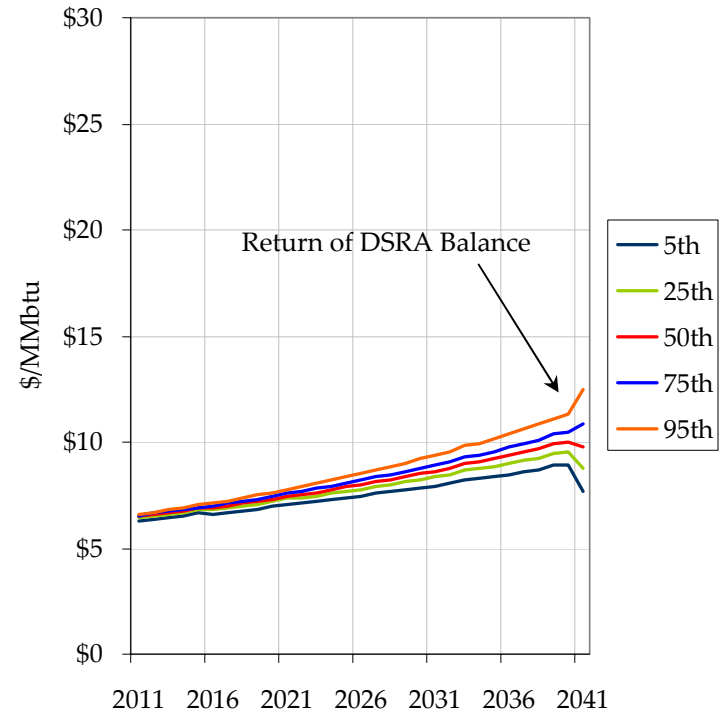
Time Series of Prices: *Distributional Information*



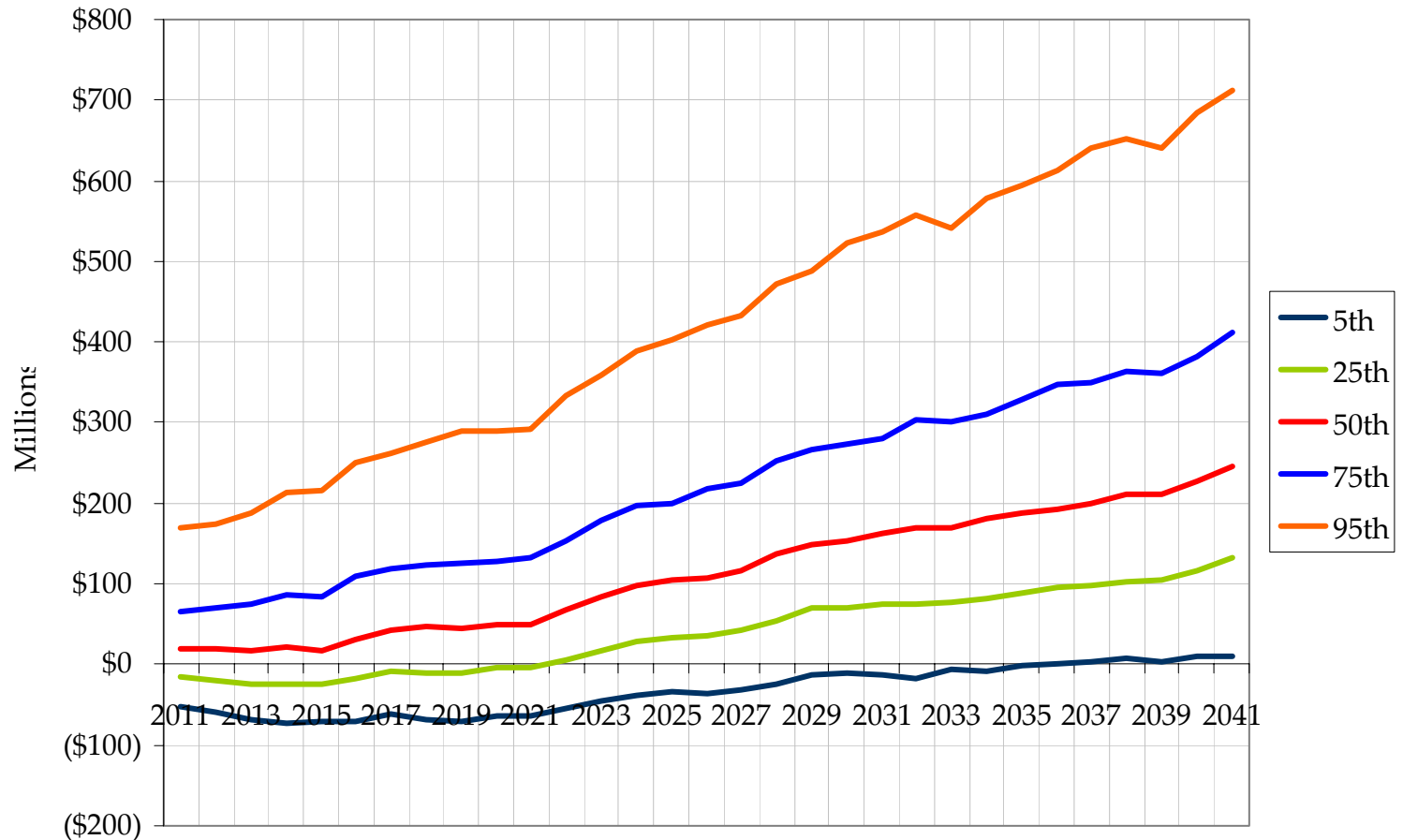
Indiana Citygate



SNG

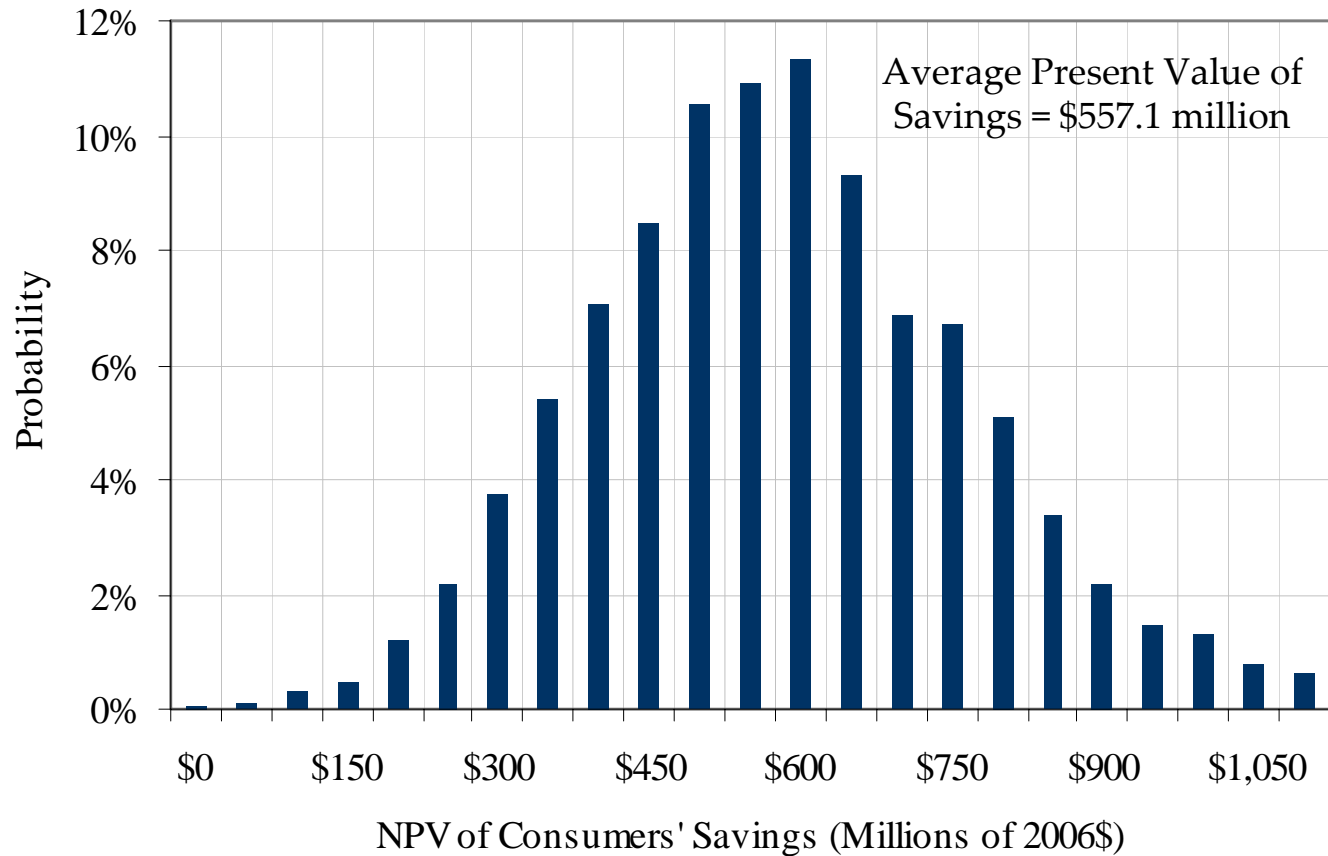


Time Series of Ratepayer Cost Savings



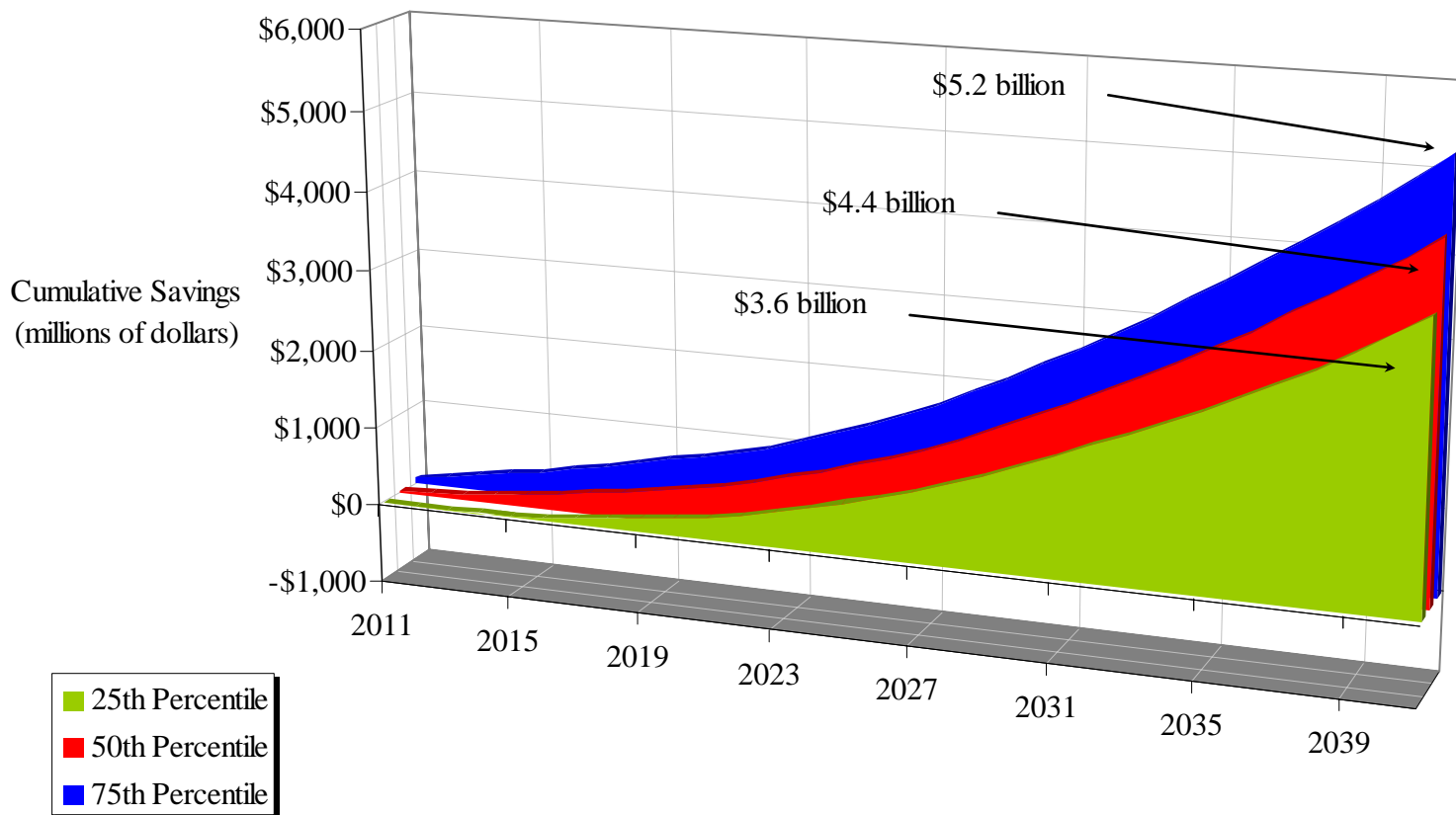
The values in the graph reflect the difference between Options #1 and #2, and therefore the savings to ratepayers on an annual basis.

NPV of Ratepayer Cost Savings



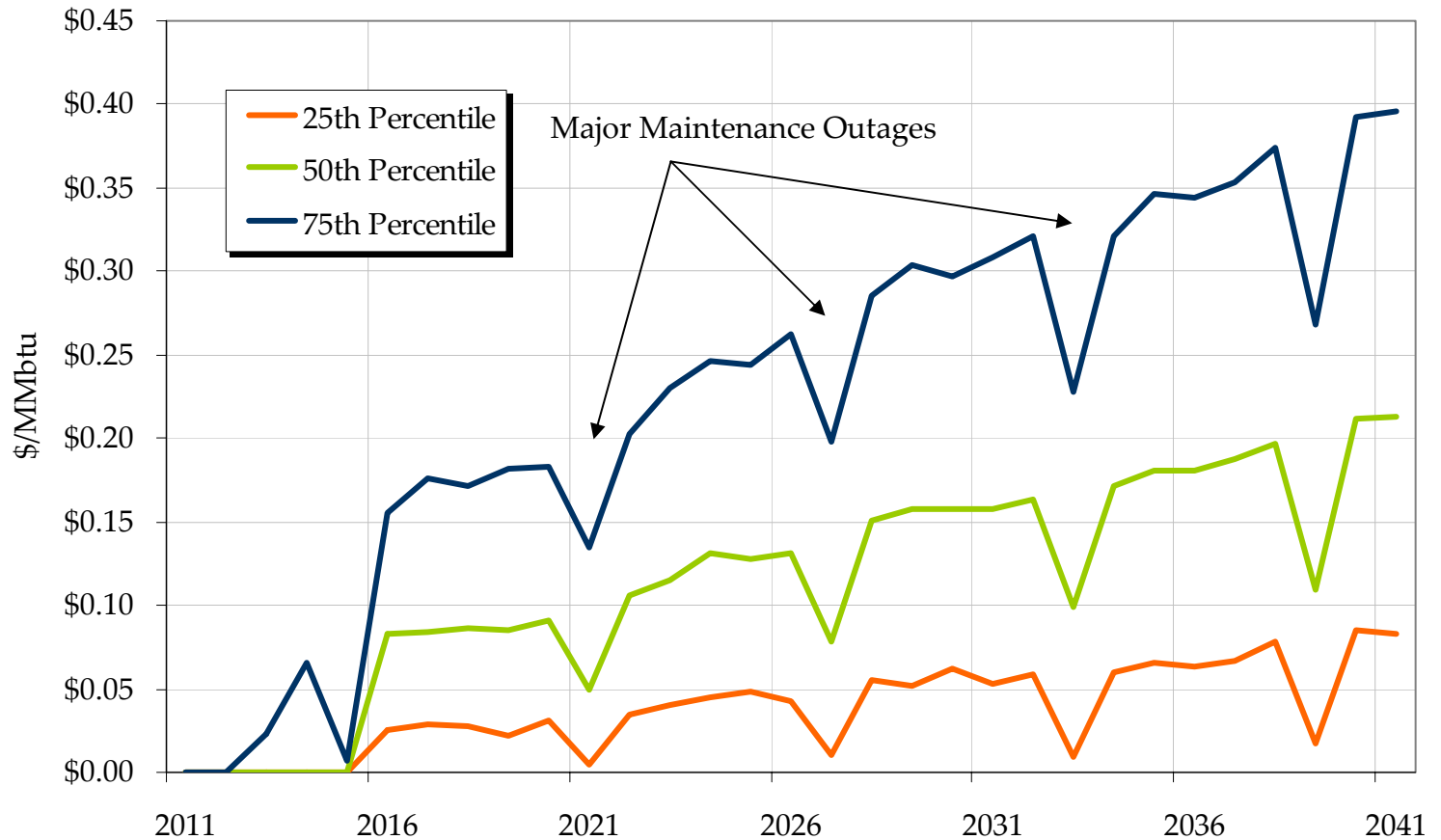
The probability that the NPV of Ratepayer Cost Savings is less than zero (*i.e.*, that consumers end up losing money as a result of this project) is less than 0.04%.

Cumulative Ratepayer Cost Savings



Over the SNG project's life, it is expected to generate 1.2 billion MMbtu of SNG. Median cumulative savings amount to \$3.62/MMbtu over the *status quo* over the life of the project.

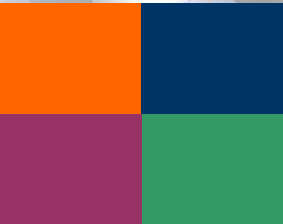
Incremental Production Benefits



The per-MMbtu credit received by ratepayers from profits on incremental production



Utility Theory/ Certainty Equivalence



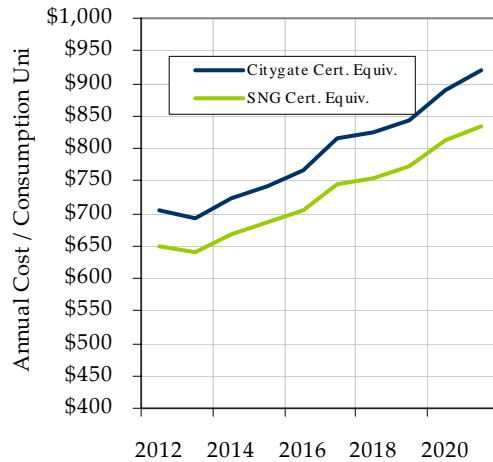
The Economic Value of Risk

- Because the SNG project serves effectively as a long-term hedge against natural gas prices for ratepayers, it must also be evaluated on the basis of risk reduction, not just cost
- The classic economic principle of “certainty equivalence” is a means of quantifying the value of a change in risk (similar to insurance pricing)

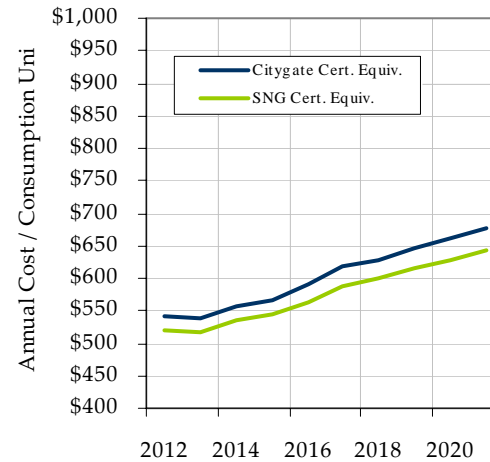
- Average annual Indiana residential/commercial natural gas consumption is 64.6 MMBtu/year per unit
- Costs reflect fuel only (no distribution or transmission surcharges, no taxes, etc)
 - To the extent that these costs increase expenditures, they make the following results more conservative
- Costs and cost uncertainties are taken from our simulation model output
- For a ratepayer served by the 4 utilities, SNG production is assumed to be, on average, 20% of the total residential and commercial natural gas consumed
 - This is the “Option #2” case
- However, 15 BCF of the production is diverted toward electric power generation. Although electric power consumers will also benefit from reduced risk from the SNG project, analysis of those savings is beyond the scope of our analysis, which focused solely on residential and commercial heating ratepayers
 - With 15 BCF out of 40 BCF production diverted to electric power, the resulting share of residential and commercial heating demand met by SNG is 12.7%
- Ratepayers are risk-averse

Understanding the Impact of Risk Aversion

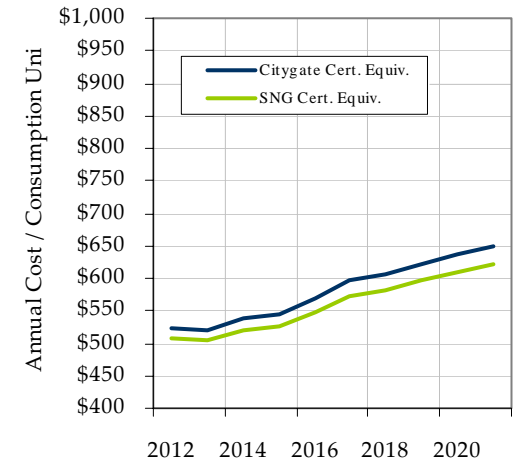
Comparison of Certainty Equivalents
(Risk-Averse Consumers)



Comparison of Certainty Equivalents
(Risk-Averse Consumers)



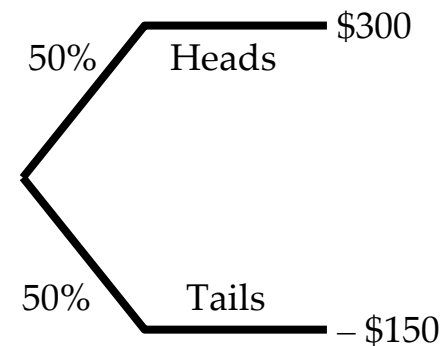
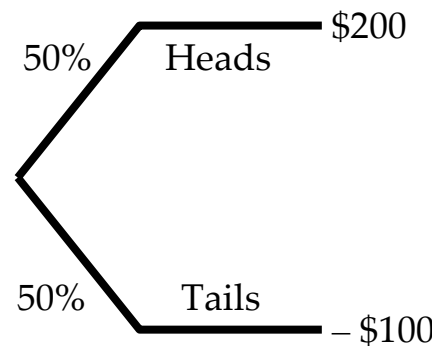
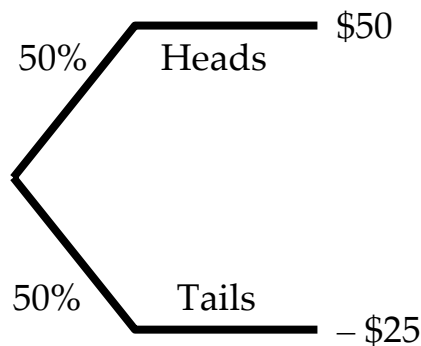
Comparison of Certainty Equivalents
(Risk-Averse Consumers)



Risk Tolerance = 50

Risk Tolerance = 200

Risk Tolerance = 300

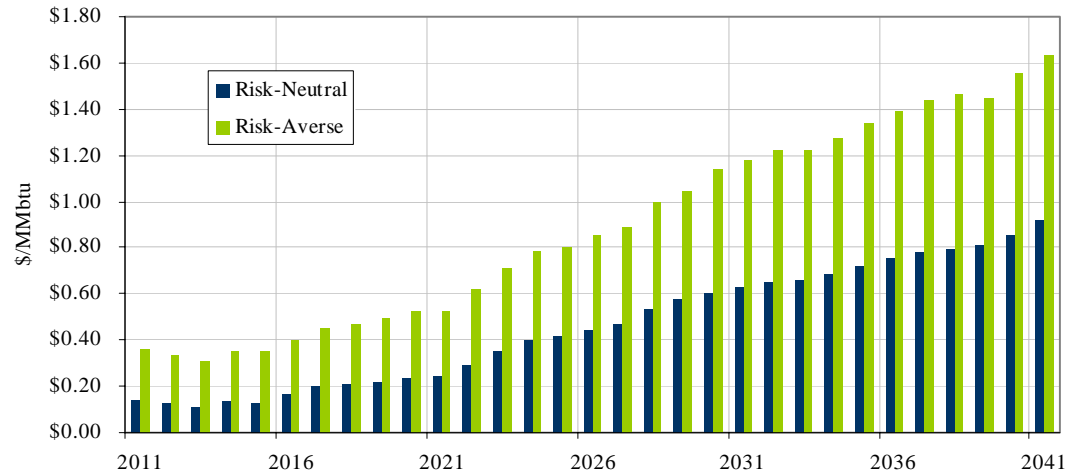


Very Risk Averse

Moderately Risk Averse

Not Very Risk Averse

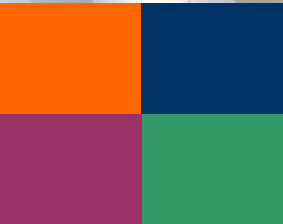
Comparison with Risk-Neutral Conditions



- The blue columns reflect what a risk-neutral ratepayer would be willing to pay (per MMbtu) to switch from Option #1 (*Status Quo*) to Option #2 (SNG)
 - Risk-neutral ratepayers are *always* willing to pay to switch to Option #2 because of the cost savings involved, even though the cost savings is modest in the first two years.
- The green columns reflect what a risk-averse ratepayer would be willing to pay (per MMbtu) to switch from Option #1 to Option #2
 - These risk-averse ratepayers are *always* willing to pay more than risk-neutral ratepayers because they receive cost savings *and* risk savings
- Therefore, the difference between the columns reflects the value of the risk savings
- Coefficient of Risk Aversion = 200



Portfolio Optimization Analysis



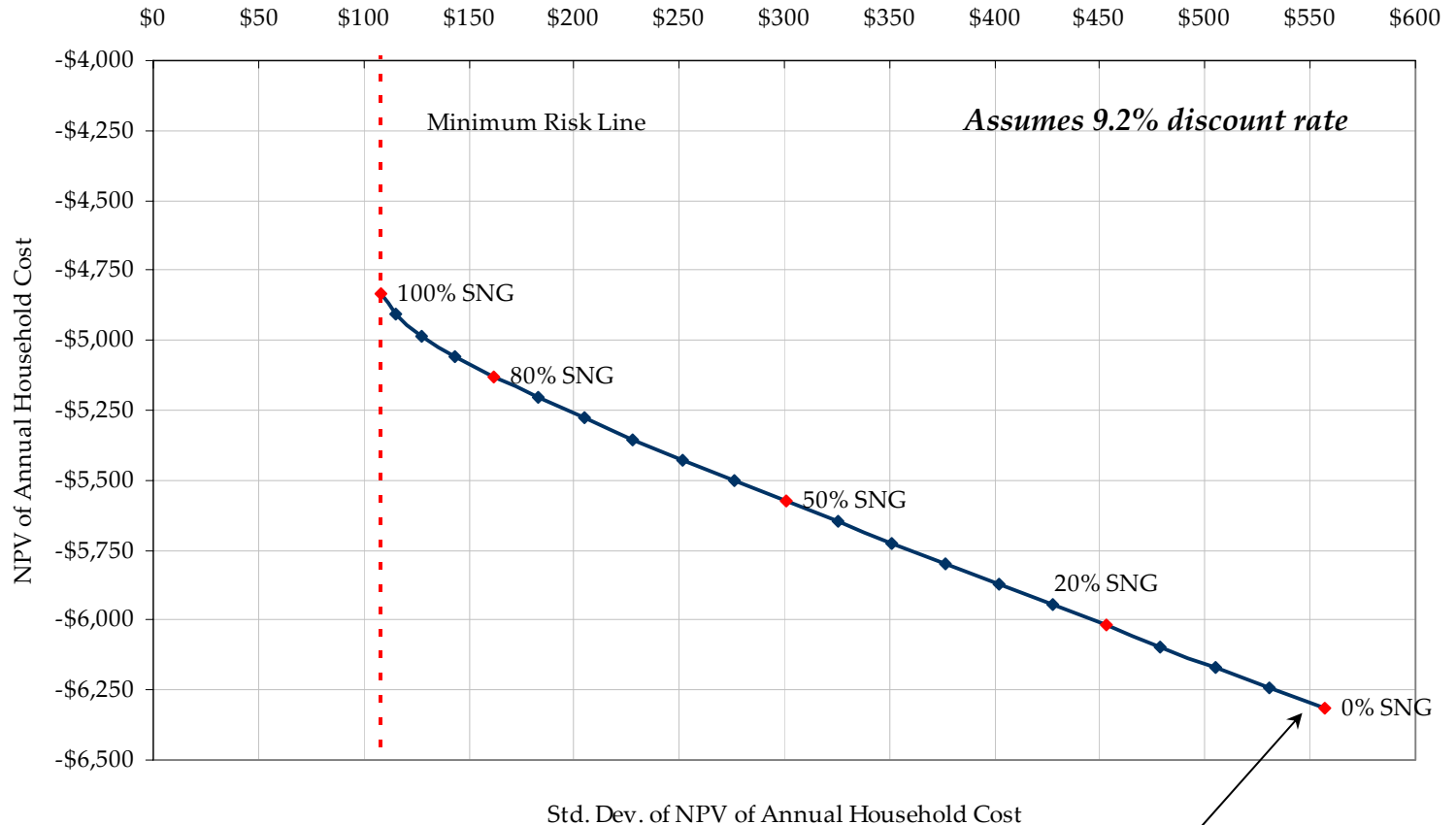
Portfolio Analysis

- The two previous analyses have treated value and risk independently
- In reality, ratepayers care about *both* the cost of consumption *and* the uncertainty surrounding that cost and the trade-off between the two
 - In fact, ratepayers may care about a variety of other factors as well: supplier diversity, environmental impact, public policy objectives (*e.g.*, jobs, tax revenue), etc.
- Regulators may be interested in the overall acceptability of a particular supply portfolio
- Portfolio analysis is a means of jointly considering both value and risk in order to select the optimal combination of resources
 - What options are available to ratepayers to trade off cost and risk?

Analysis Assumptions

- Potential supply portfolios could include anything from 0% SNG to 100% SNG, as measured by a typical household's annual exposure
- The cost metric used was NPV of household expenditures **through 2041**
- The risk metric used was the standard deviation of the NPV of household expenditures **through 2041**
- Two competing objectives:
 - Ratepayers/Regulators want lower costs
 - Ratepayers/Regulators want lower risks
- Usually, this involves a trade-off; it is rare to find an alternative with strictly lower risk *and* strictly lower cost

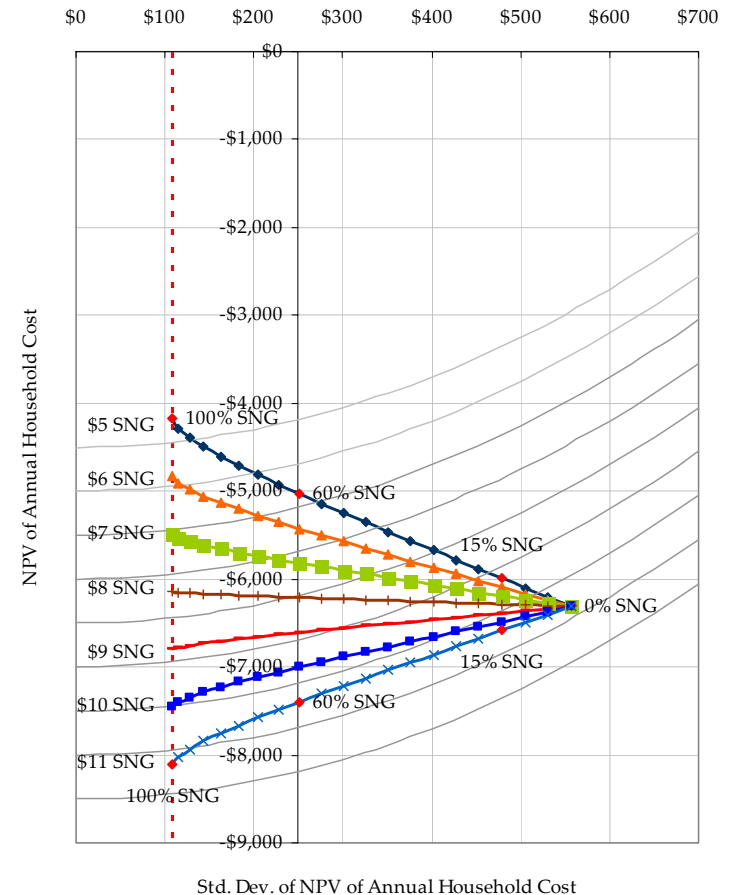
The Base Portfolio



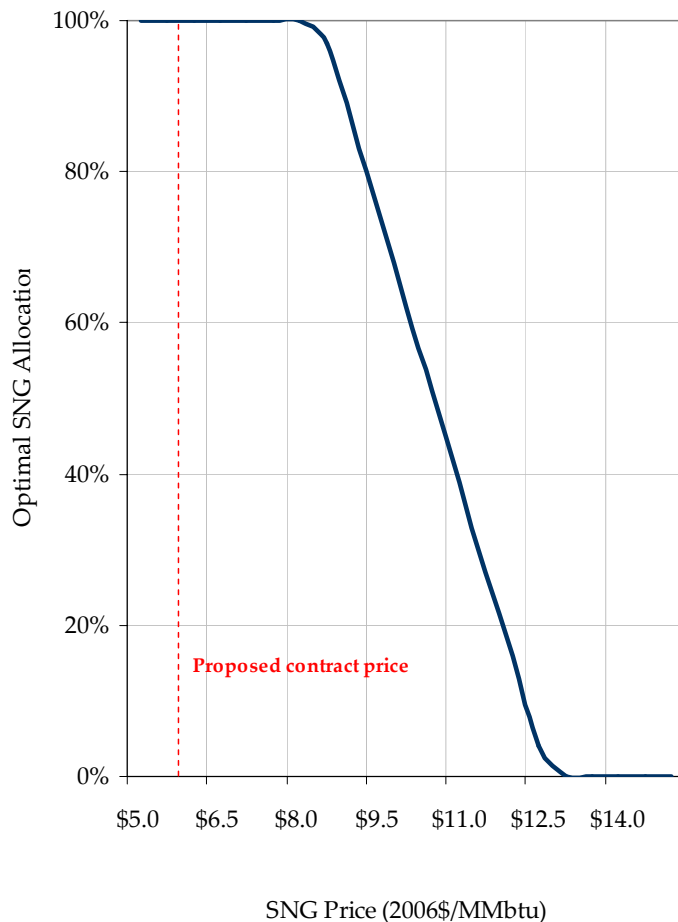
Note that the status quo portfolio has over 5x the risk of the minimum risk combination of SNG and natural gas *and* is higher cost over the life of the project.

Examining Sensitivity of Portfolio Allocations

- We demonstrate these results for the price of SNG currently being proposed: \$6/MMbtu
- How sensitive are consumer preferences to changes in this number, given that many project parameters are not yet finalized?
- The belief is that consumers' benefits are broadly robust to variations that would alter the proposed fixed SNG price: is that true?
- Consider our standard consumer (risk tolerance of 200)...



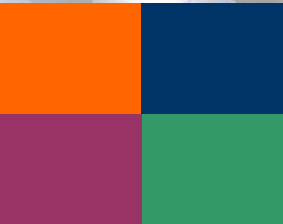
Optimal Allocation Path



- Why is there no significant curvature in the frontier on the previous slide?
- There is, but the SNG option has such little risk (as proposed) that the “bend” in the frontier is imperceptible
 - There is little diversification benefit when one alternative so significantly appears to dominate the other
- The price of SNG has to increase substantially before it loses its dominant weighting in this consumer’s optimal portfolio




Conclusions: Valuing Risk Reduction



SNG as a Long-Term Hedge

- Hedge to whom?
 - Ratepayers: exposed to commodity risk through fuel adjustment provisions
 - Gas utilities: exposed to volumetric risk through substitution by customers
- What is the SNG project hedging, and how?
 - For ratepayers, SNG provides a means of mitigating commodity price risk
 - For gas utilities, SNG provides a more diverse and lower cost supply portfolio and a potential means of mitigating volumetric risk

Volumetric Risk

- 
- For gas utilities, commodity price risk is passed through to ratepayers
 - This is a short-term ability, however, because in the long run ratepayers can switch to natural gas substitutes (*e.g.*, electricity) if commodity price risk becomes excessive
 - Substitution away from natural gas introduces volumetric risk for gas utilities who may see their demand drop over long periods of time
 - Gas utilities, then, have an interest in preventing switching
 - Encourage low prices (relative to substitutes)
 - Encourage price stability (relative to substitutes)

The Role of a Hedge

- How do traditional hedges address volumetric risk?
 - Futures/Forward contracts: address price stability, but may result in long-term uneconomic positions
 - Options: address price stability, but long-term options, even if available, would be extraordinarily expensive for natural gas because of the volatility
 - The credit requirements of a long-term (5+ years) financial hedge for natural gas would make it prohibitively expensive
- A False Dichotomy
 - The choice should not be seen as between not hedging and a financial hedge as the only hedge
 - Other alternatives are available that enable ratepayers to mitigate commodity price risk

Elasticity, Switching, and Hedging with SNG

- Hedging
 - A volumetric hedge should prevent substitution away from natural gas
 - Our modeling assumes that ratepayers evaluate substitution against two factors: cost and risk
- Price Elasticity
 - Price elasticity of (residential) demand for natural gas is relatively low
 - Bohi & Zimmerman (1984): short-term = -0.2, long-term = -0.3
 - Bernstein & Griffin (2005): short-term = -0.12, long-term = -0.36
 - For Indiana, Bernstein & Griffin estimate short- and long-term price elasticity at -0.139 and -0.163 respectively
 - In other words, a 10% increase in price would cause a long-run decrease in Indiana residential demand of 1.63%
 - To the extent that the SNG project reduces prices, these results suggest that demand would increase (or at least that portion of demand driven by the price effect)
- Risk Elasticity
 - Economics has not traditionally had a concept of “risk elasticity,” but ratepayers are clearly sensitive to uncertainty in consumption streams
 - Unlike traditional financial hedges, the SNG project can provide a risk elasticity gain *in addition to* a price elasticity gain for gas utilities with respect to volumetric risks – this is akin to a “free” hedge in present value terms (you typically don’t get risk reduction for a lower cost)

Valuing Risk Reduction

- Decomposing Ratepayer Benefits into Cost Reduction and Risk Reduction
- Consider a ratepayer choosing between a fixed rate and a variable rate mortgage
 - If the choice is between a fixed-rate mortgage at 7% and a variable-rate mortgage with an expected rate of 6%, the value of the fixed-rate mortgage is lower risk, but it must be balanced against the lower cost (in expected value terms) of the variable-rate mortgage
 - If the choice is between a fixed-rate mortgage at 7% and a variable-rate mortgage with an expected rate of 7%, the incremental value of the fixed-rate mortgage is strictly the lower risk – both have equal costs in expected value terms
- The SNG project is like comparing a fixed-rate mortgage at 6% with a variable-rate mortgage at 7%
 - Both cost *and* risk reduction are available
- Accordingly, the “hedge” value of the project must isolate the risk component of the gain
- One analogy would be to an in-the-money (call) option
 - Part of its value comes from the right of the option holder to purchase the underlying asset for less than its market price
 - Part of its value (the “time value” aspect) is derived from controlling uncertainty
- Important – these types of securities do not exist for ratepayers over a thirty-year term. There are no comparable market substitutes that provide similar cost-risk benefits

Hedge Value to Ratepayers

	Millions of Dollars		Cumulative Nominal \$/MMbtu	Average 2006\$/ MMbtu
	Nominal (Cumulative)	2006\$ (NPV)		
Cost Reduction Value	\$4,363	\$557	\$3.62	\$0.20
Risk Reduction Value	\$1,131	\$646	\$0.94	\$0.30
Total Hedge Value to Ratepayers	\$5,494	\$1,203	\$4.56	\$0.50

- Nominal cost reduction value is the cumulative difference between Options #1 (*Status Quo*) and #2 (SNG Mix) over the term of the project
- Real cost reduction value is the NPV of ratepayers' savings over the term of the project
- Total hedge value is the cumulative household willingness to pay to switch from Option #1 to Option #2 over the term of the project (or the NPV of this value in 2006\$ terms)
- Cumulative \$/MMbtu values reflect 1.2 billion MMbtu produced over the term of the project and divided into cumulative nominal cost/risk reduction values
- Average 2006\$/MMbtu values reflect annual savings values divided by annual household natural gas consumption
- Average 2006\$/MMbtu cost reduction values reflect the average annual difference between Option #1 and Option #2 prices[‡] assuming a risk tolerance of 200
- In each case, the risk reduction value is the difference between the total hedge value and the cost reduction value

[‡] Option #2 prices reflect ~87.3% Citygate gas and ~12.7% SNG

Summary of Conclusions

- Simulation Model – *The Monetary Value of SNG*
 - Expected costs for the SNG project under the proposed terms show modest cost savings for ratepayers in the early years, growing to significant cost savings as the fixed/variable cost distinction becomes prominent
 - The price uncertainty resulting from the SNG project is considerably lower than in the *status quo* case providing an immediate and significant reduction in risk
 - Cumulative cost savings to ratepayers over the life of the project exceed \$4 billion with minimal downside risk
- Utility Theory – *The Risk Reduction Value of SNG*
 - When comparing the risk-equivalent annual costs to residential ratepayers, the “Option #2” alternative of the SNG project produces a lower cost than the “Option #1” *status quo*
 - Risk-averse ratepayers value the lower-risk nature of the SNG more highly than natural gas
 - These results are robust across changes to household gas consumption and risk aversion

Summary of Conclusions

- Portfolio Optimization – *Balancing Value and Risk*
 - Ratepayers are likely to care about both cost and risk; regulators are likely to be concerned about the long-term characteristics of the supply portfolio. Portfolio analysis informs both interests.
 - Because the SNG project economics strictly dominate the *status quo* on both cost and risk objectives, ratepayers should overwhelmingly prefer a large allocation of SNG in the market's supply portfolio. This is supported by the portfolio analysis.
- Valuing Risk Reduction
 - For gas utilities, the SNG project will reduce substitution risk by lowering ratepayer costs and price shock uncertainty
 - For ratepayers, the SNG project reduces costs by \$4.4 billion nominal (\$557 million in 2006\$) and provides risk reduction worth \$1.1 billion nominal (\$646 million in 2006\$)



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