



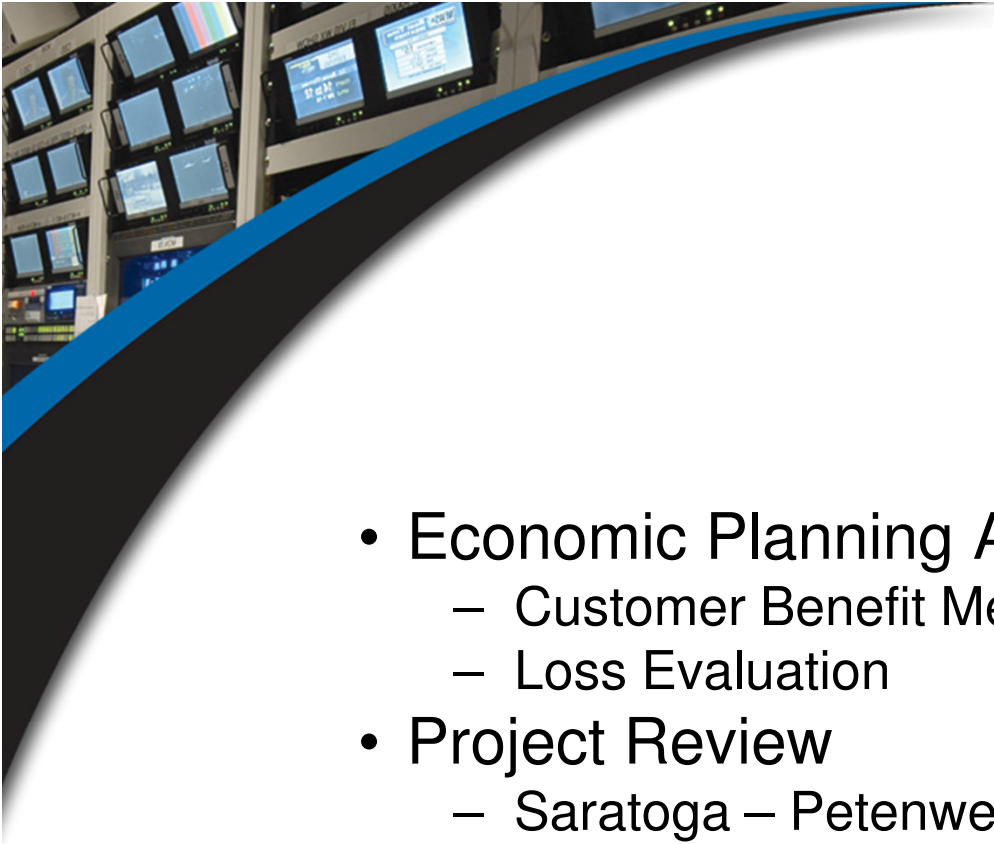
2012 Economic Planning Study Results

Arash Ghodsian and Erik Winsand
ATC Economic Planning

November 27, 2012

Helping to **keep the lights on**,
businesses running and communities strong®





Introduction

- Economic Planning Analysis Metrics
 - Customer Benefit Metric
 - Loss Evaluation
- Project Review
 - Saratoga – Petenwell 138 kV
 - Milwaukee Area 138 kV
- Project Analysis and Results
- Next Steps



PROMOD Energy Benefits Description

- PROMOD used to analyze 2022 study year
- Difference analysis performed to determine project savings
- All Futures analyzed using ATC Customer Benefit (CB) Metric:

Settlements Format for CB Metric

- Load Pays local Locational Marginal Price (LMP)
- Generator Revenues Received at local Gen LMP
- + Cost of Utility Generation (Production Cost)
- FTR Revenue to the Utility
- Loss Refund Revenues for over-collection
- = Impact to Ratepayers



Customer Benefit Metric Components

Customer Benefit Metric Components:

- Net Production Cost excluding IPPs within ATC
- IPP Purchase Cost to Utilities
- Import Cost
- Export Revenue
- Congestion Cost
- Revenue from Existing External FTRs
- ATC Internal FTR Value
- Marginal Loss Cost
- Loss Refund on Internal Transactions and Imports
- “Credit” for Losses Already Captured in Production Cost
- Cost of Load Changes due to Losses
- Cost due to CO₂ Emissions (CO₂ Tax)



Loss Savings Description

- Loss evaluation is an important component of economic project analysis
- PROMOD difference analysis performed to determine system loss savings (\$)
 - Loss savings (MWHrs) calculated from PROMOD
 - Economic value of loss savings determined by pricing losses (MWHrs) at PROMOD area LMPs (\$/MWHrs)



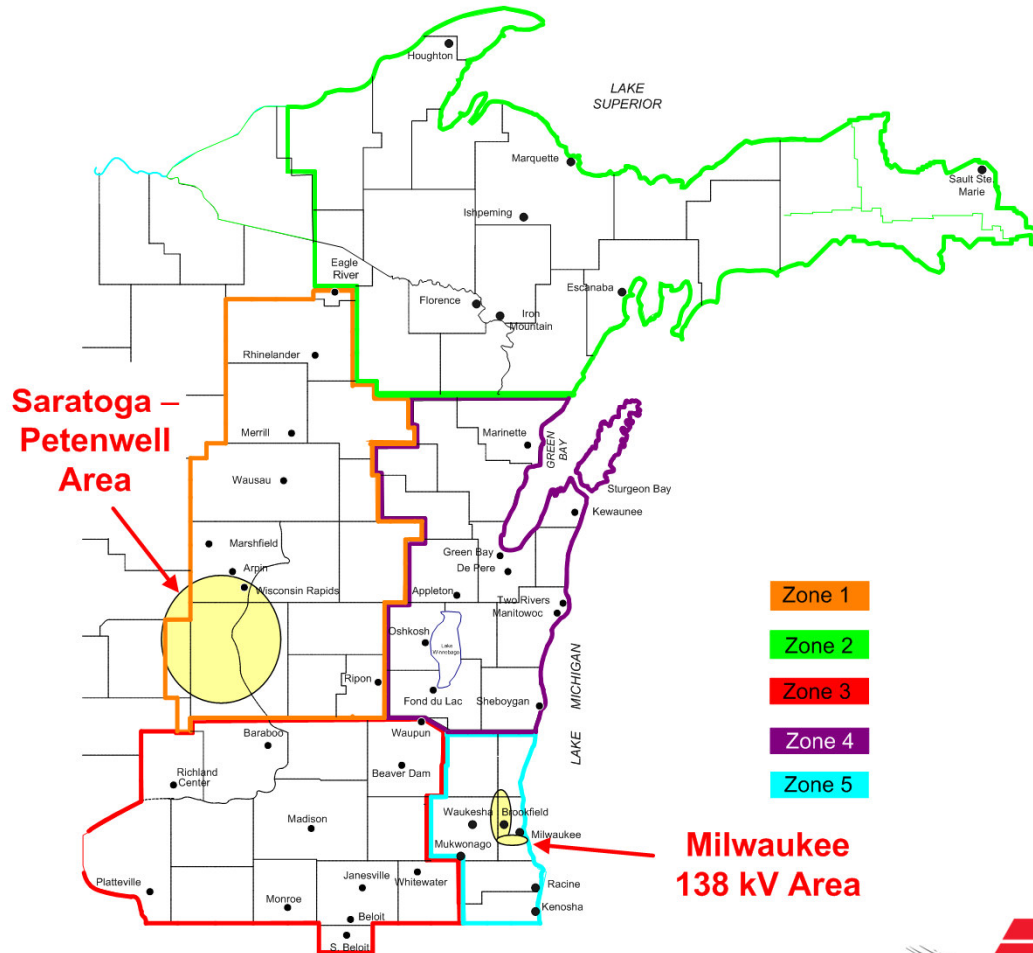
ATC 2022 – Analysis Results

- Single-Year PROMOD Savings
 - Shown in Millions of Dollars for 2022 (\$M – 2022)
 - Savings based on difference analysis using Customer Benefit Metric
- 40-Year PROMOD Savings
 - Shown in Millions of Dollars for 2012 (\$M – 2012)
 - Savings based on difference analysis using Customer Benefit Metric
 - Calculations based on:
 - Assumed 40-Year Economic Life of Project
 - 3.0% Inflation Rate
 - 6.7% Nominal Discount Rate

Project Review

ATC 2012 Order 890 Economic Analysis – Projects Areas Being Studied

Constrained Area	Analysis Details
Saratoga - Petenwell 138 kV	2012 Order 890 Study Area
Granville - Butler - Bluemount - St. Martins - Oak Creek 138 kV	2012 Order 890 Study Area





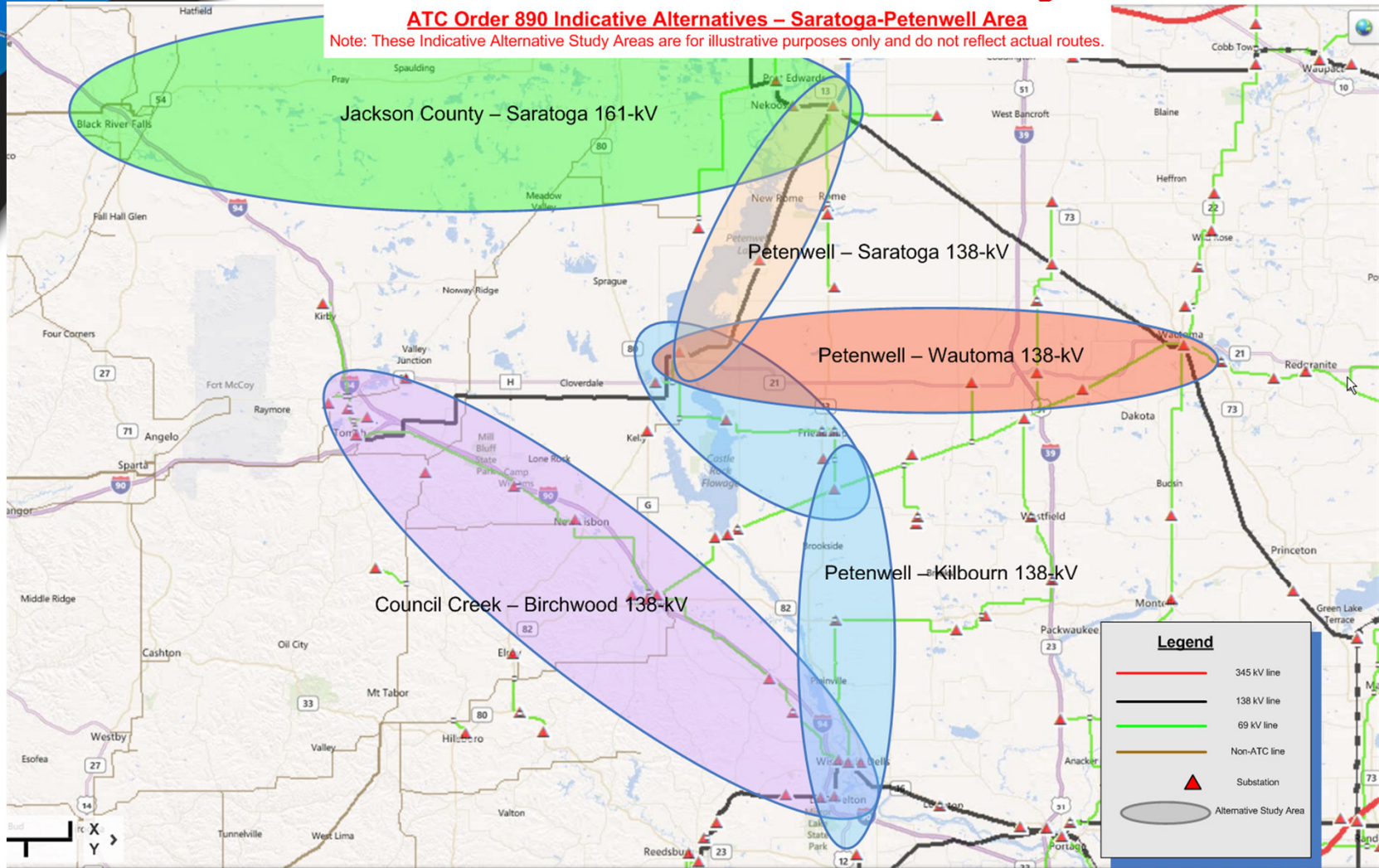
Project Review

- Saratoga – Petenwell 138 kV
 - Uprate existing 138 kV line
 - Council Creek – Birchwood 138 kV line
 - Jackson County – Saratoga 161 kV line
 - Petenwell – Kilbourn 138 kV line
 - Petenwell – Wautoma 138 kV line

Project Review

ATC Order 890 Indicative Alternatives – Saratoga-Petenwell Area

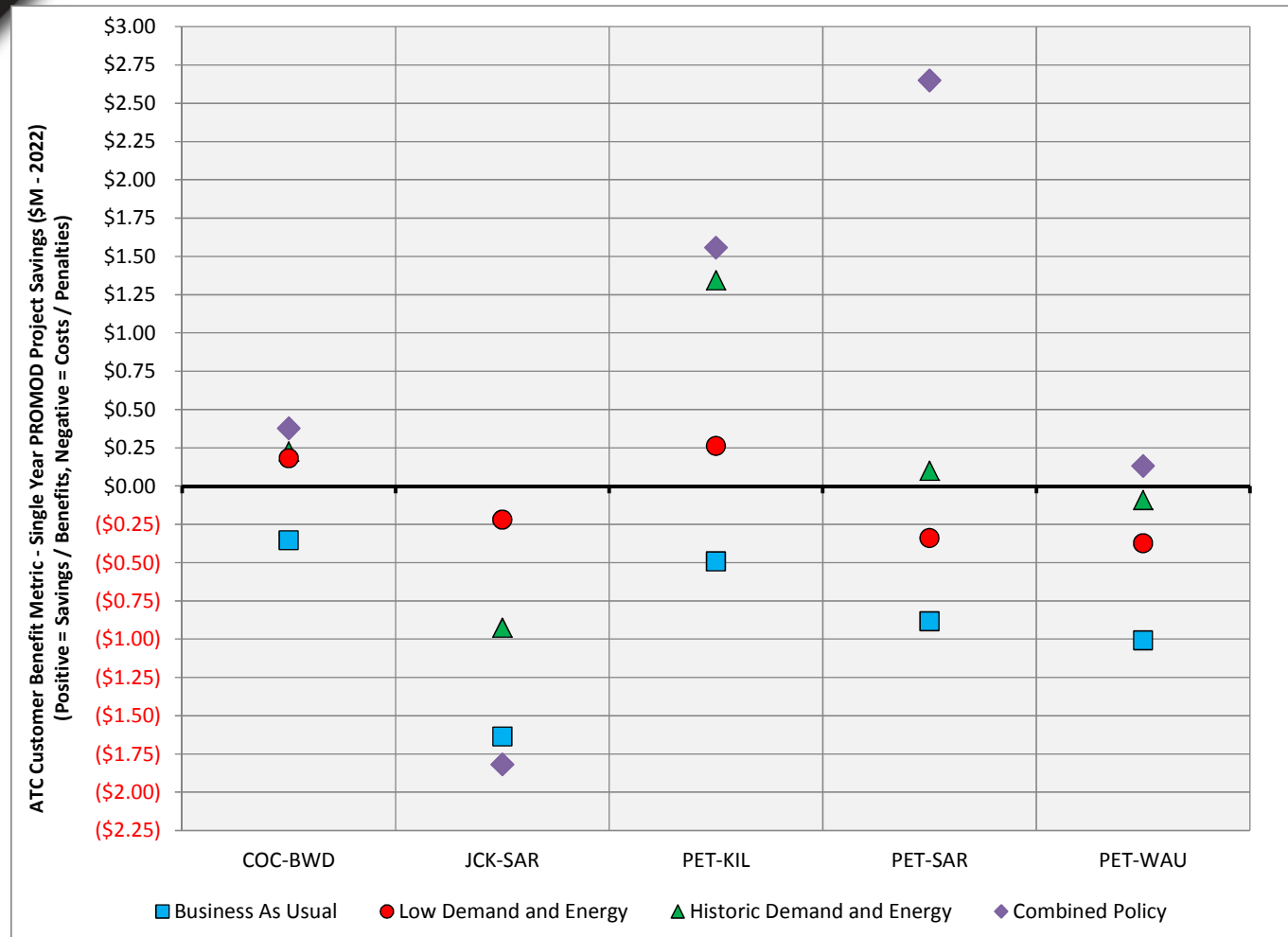
Note: These Indicative Alternative Study Areas are for illustrative purposes only and do not reflect actual routes.



ATC 2022 – Analysis Results

Single-Year PROMOD Savings

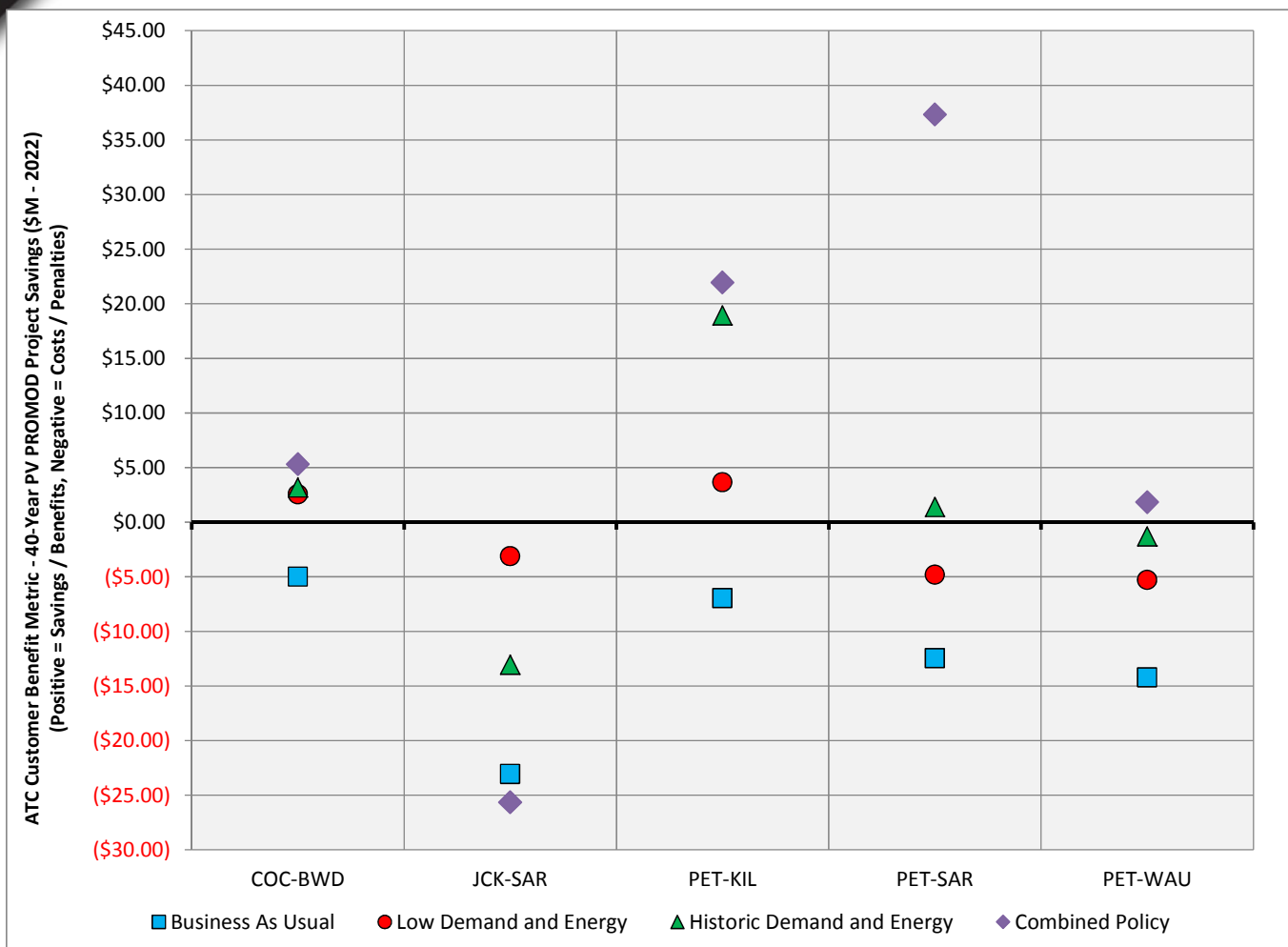
Petenwell-Saratoga Area



ATC 2022 – Analysis Results

40-Year Present Value PROMOD Savings

Petenwell-Saratoga Area



ATC 2022 – Analysis Results

Petenwell-Saratoga Area

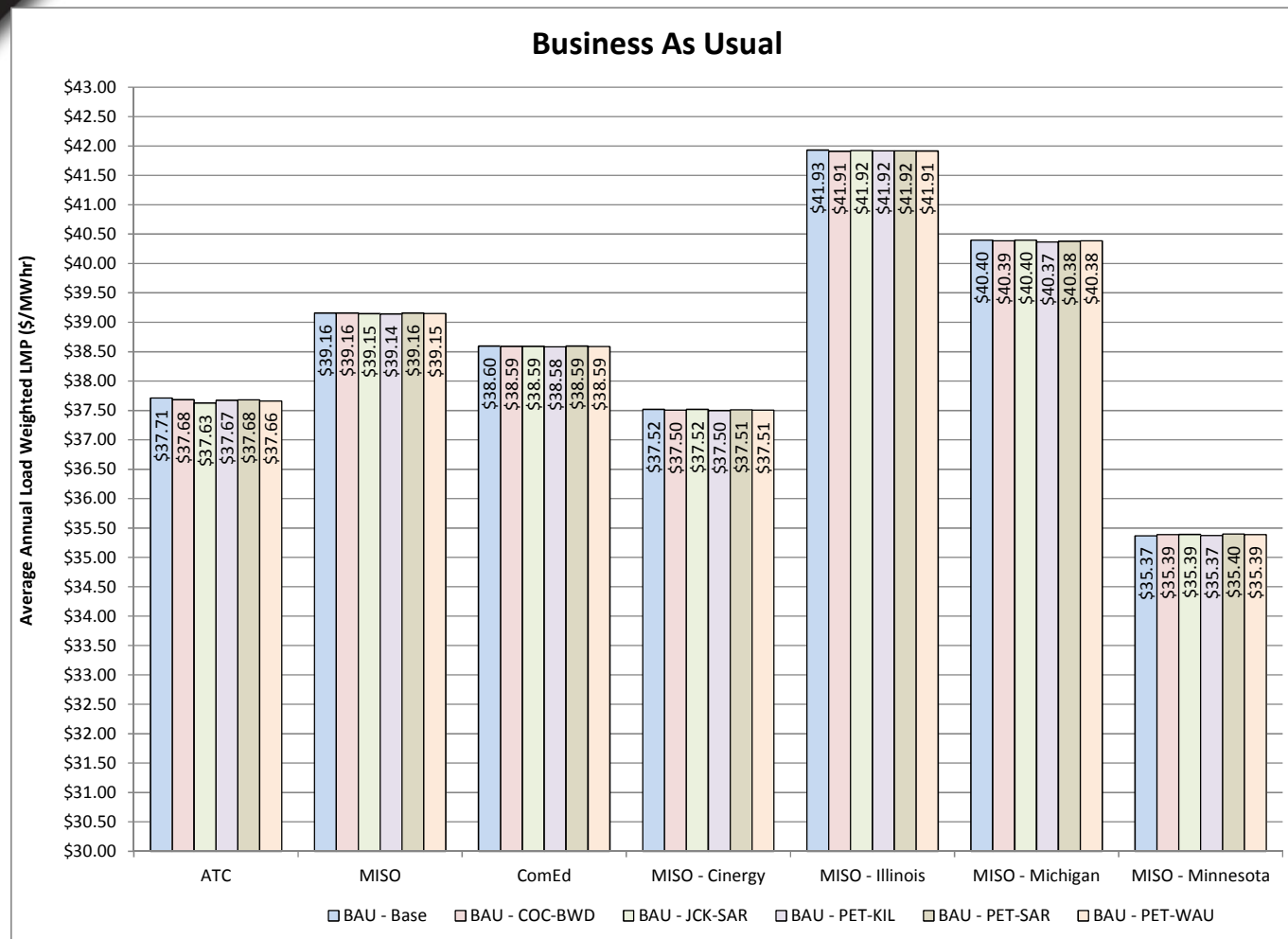
Project	ATC Benefit Impact (\$M - 2022)			
	Business As Usual	Low Demand and Energy	Historic Demand and Energy	Combined Policy
Petenwell-Badger West-Saratoga 138 kV project	(\$0.88)	(\$0.34)	\$0.10	\$2.65
Council Creek-Birchwood 138 kV Project	(\$0.36)	\$0.18	\$0.23	\$0.38
Jackson County-Saratoga 161 kV Project	(\$1.64)	(\$0.22)	(\$0.93)	(\$1.82)
Petenwell-Kilbourn 138 kV Project	(\$0.49)	\$0.26	\$1.34	\$1.56
Petenwell-Wautoma 138 kV Project	(\$1.01)	(\$0.38)	(\$0.09)	\$0.13

(\$) = Costs / Penalties

\$ = Savings / Benefits

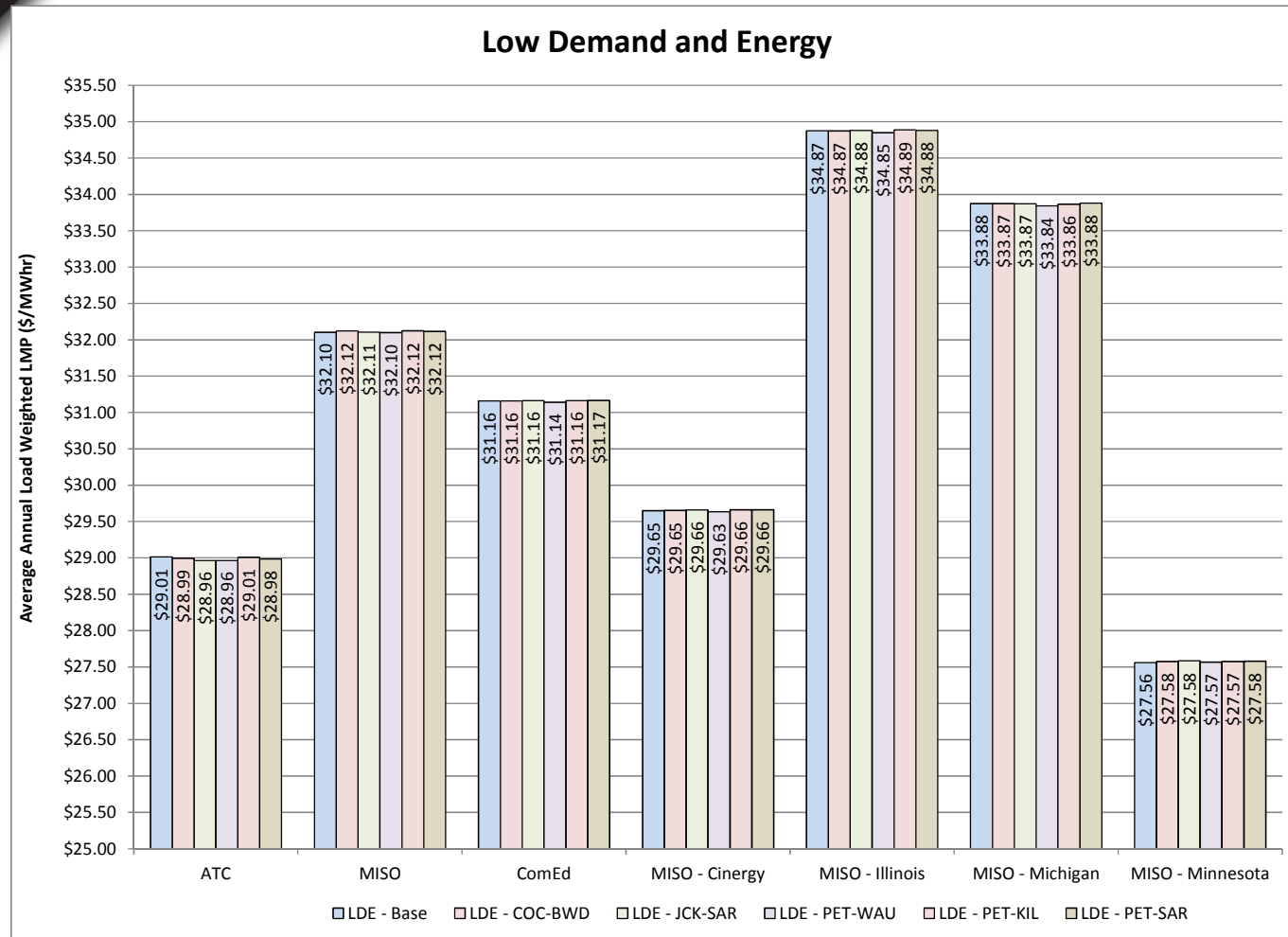
ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



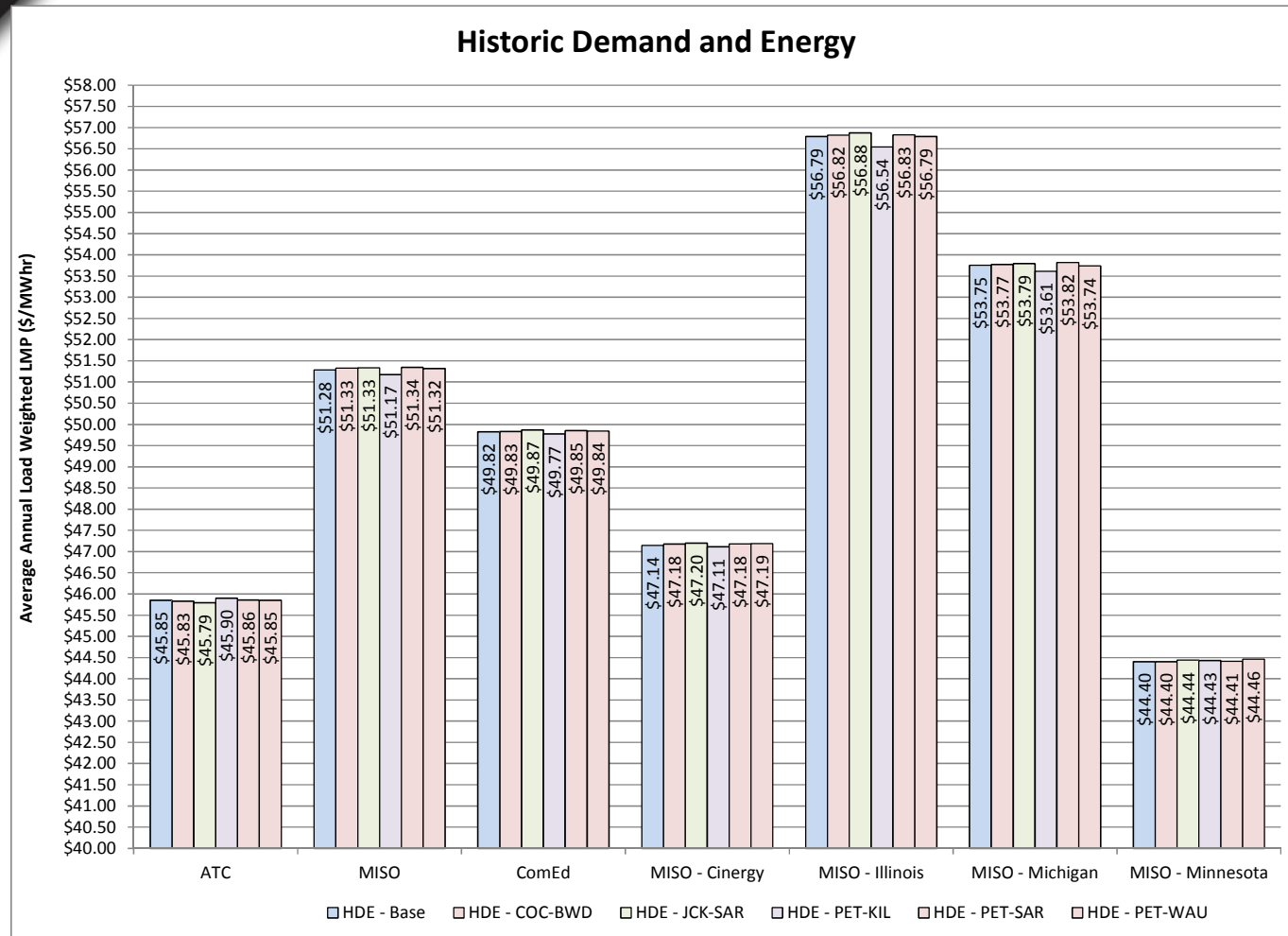
ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



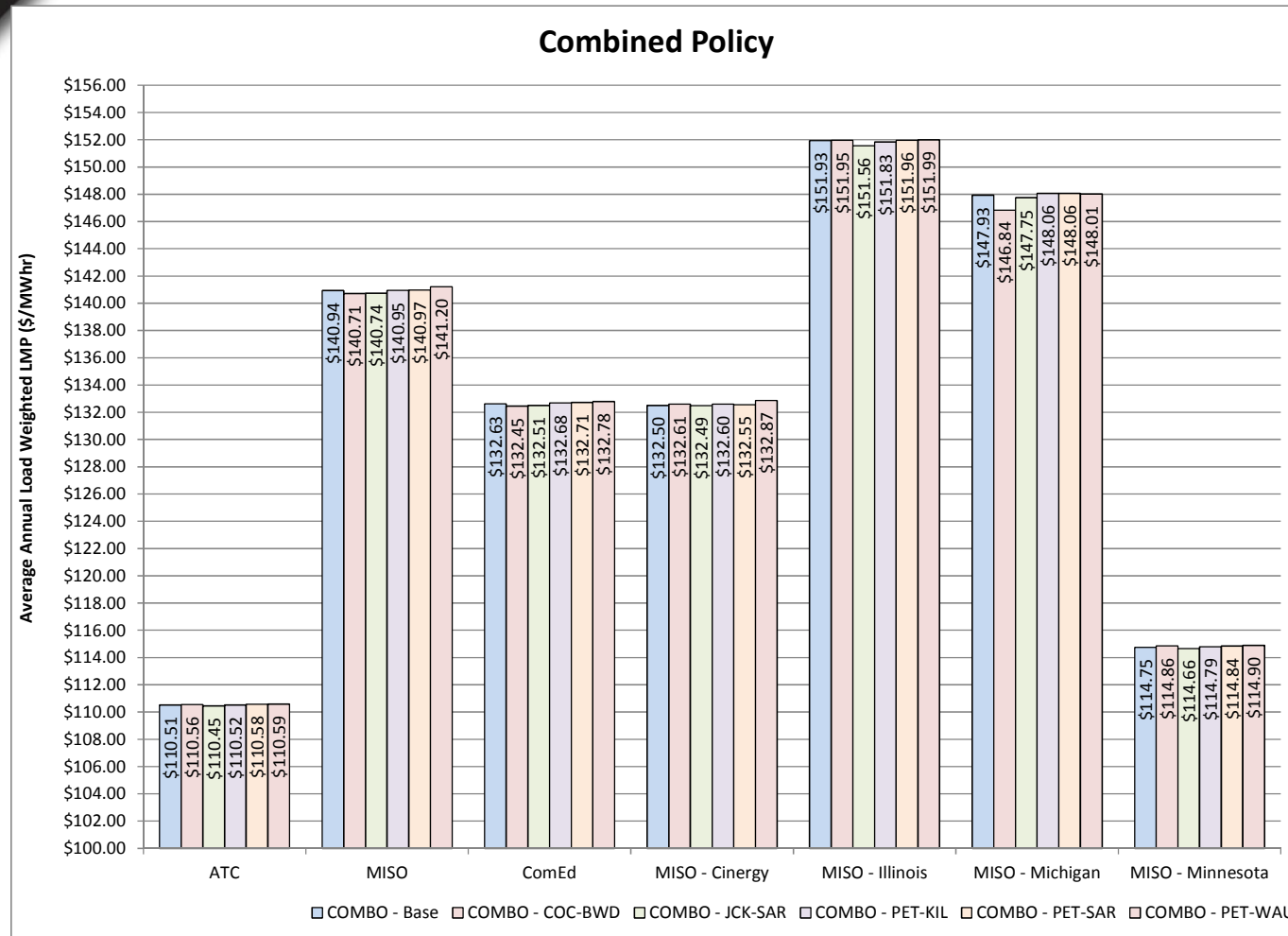
ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



ATC 2022 – Analysis Results

Congestion Report

Business As Usual Future						
Constraints	Annual Binding Hours					
	Base	COC-BWD	JCK-SAR	PET-KIL	PET-SAR	PET-WAU
Petenwell - Badger West 138 kV	286	115	6	153	0	20
Arpin 345/138 kV transformer	1	2	0	1	1	1

ATC 2022 – Analysis Results

Congestion Report

Historic Demand and Energy						
Constraints	Annual Binding Hours					
	Base	COC-BWD	JCK-SAR	PET-KIL	PET-SAR	PET-WAU
Petenwell - Badger West 138 kV	199	77	0	146	0	10
Arpin 345/138 kV transformer	7	7	0	8	8	7

ATC 2022 – Analysis Results

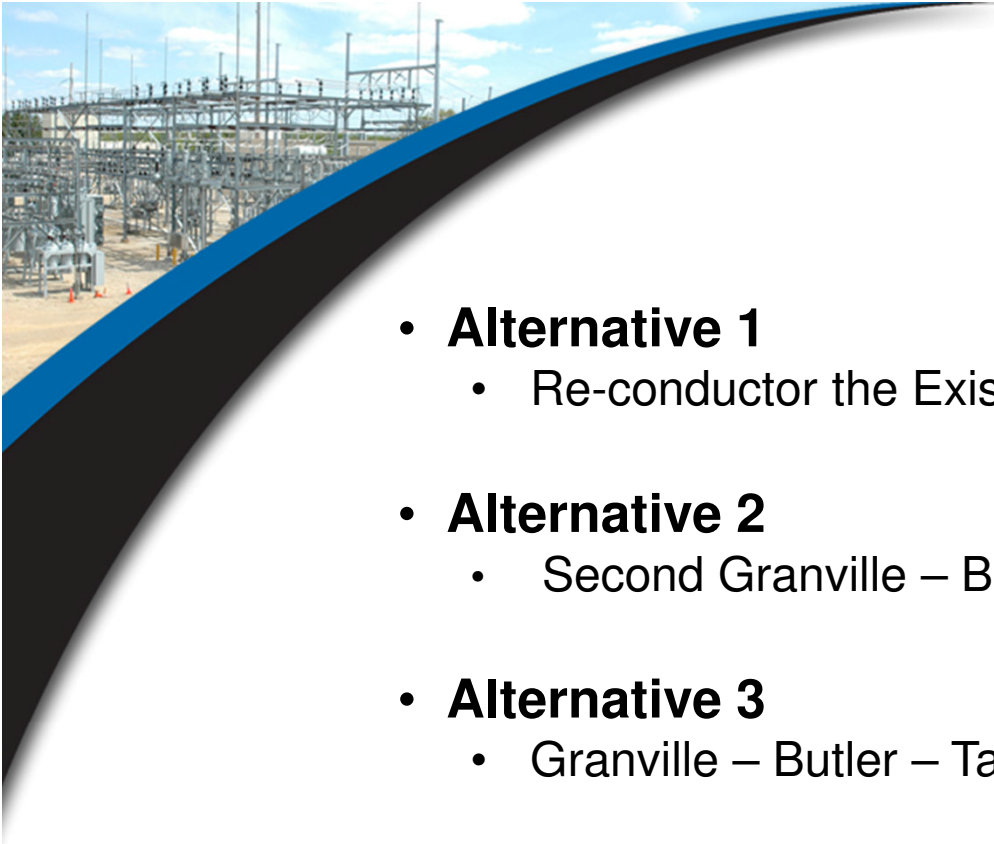
Congestion Report

Low Demand and Energy						
Constraints	Annual Binding Hours					
	Base	COC-BWD	JCK-SAR	PET-KIL	PET-SAR	PET-WAU
Petenwell - Badger West 138 kV	372	149	0	280	0	17
Arpin 345/138 kV transformer	0	0	0	0	0	0

ATC 2022 – Analysis Results

Congestion Report

Combined Policy						
Constraints	Annual Binding Hours					
	Base	COC-BWD	JCK-SAR	PET-KIL	PET-SAR	PET-WAU
Petenwell - Badger West 138 kV	12	7	0	16	0	2
Arpin 345/138 kV transformer	0	0	0	0	0	0



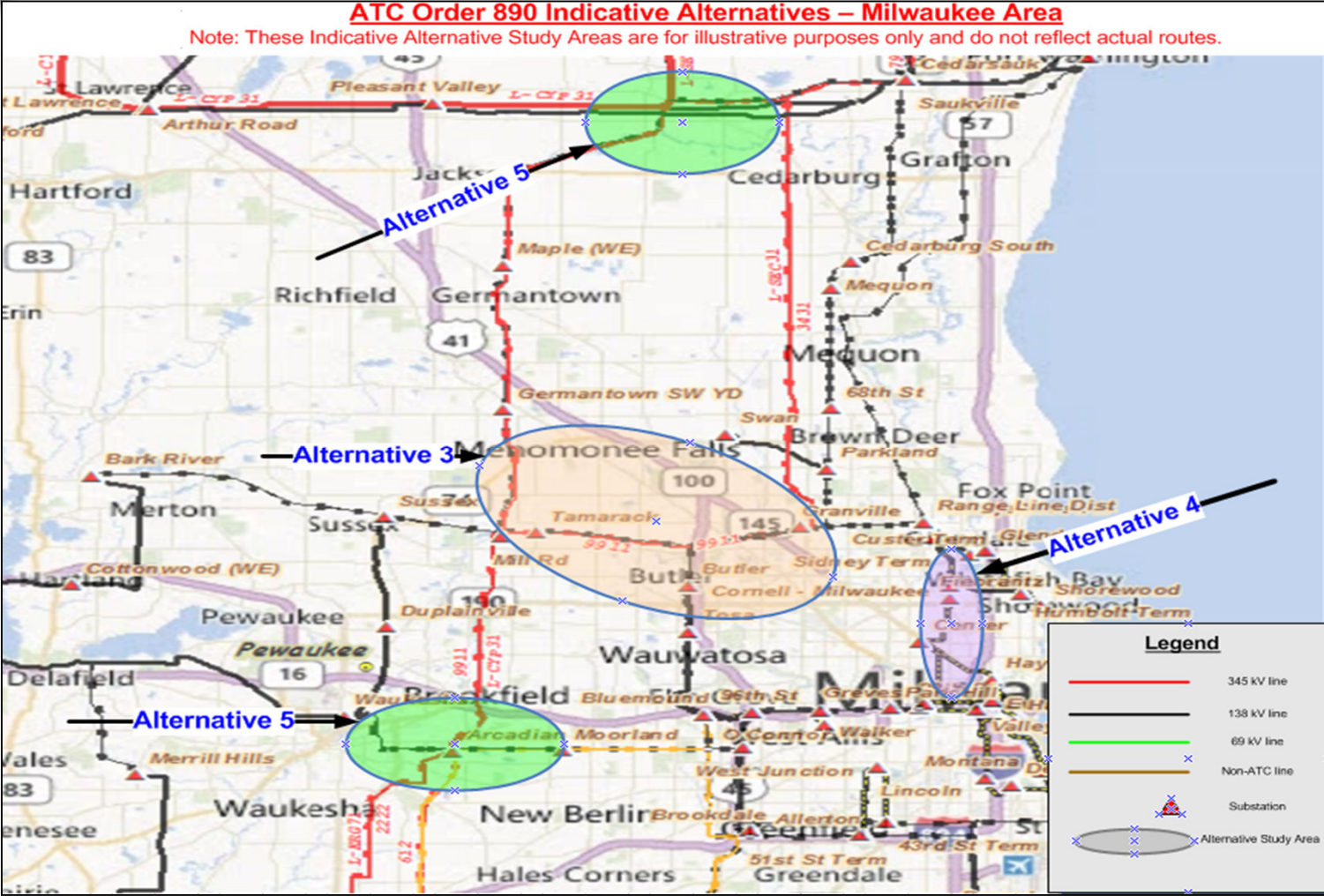
Milwaukee Area

- **Alternative 1**
 - Re-conductor the Existing Granville – Butler 138 kV Line
- **Alternative 2**
 - Second Granville – Butler 138 kV Line
- **Alternative 3**
 - Granville – Butler – Tamarack 138 kV Line
- **Alternative 4**
 - Close Cornel – Fiebrantz 138 kV Line & Adding a Series Reactor on the 138 kV line
- **Alternative 5**
 - Granville – Arcadian – Bluemound 345 kV Loop

Project Review

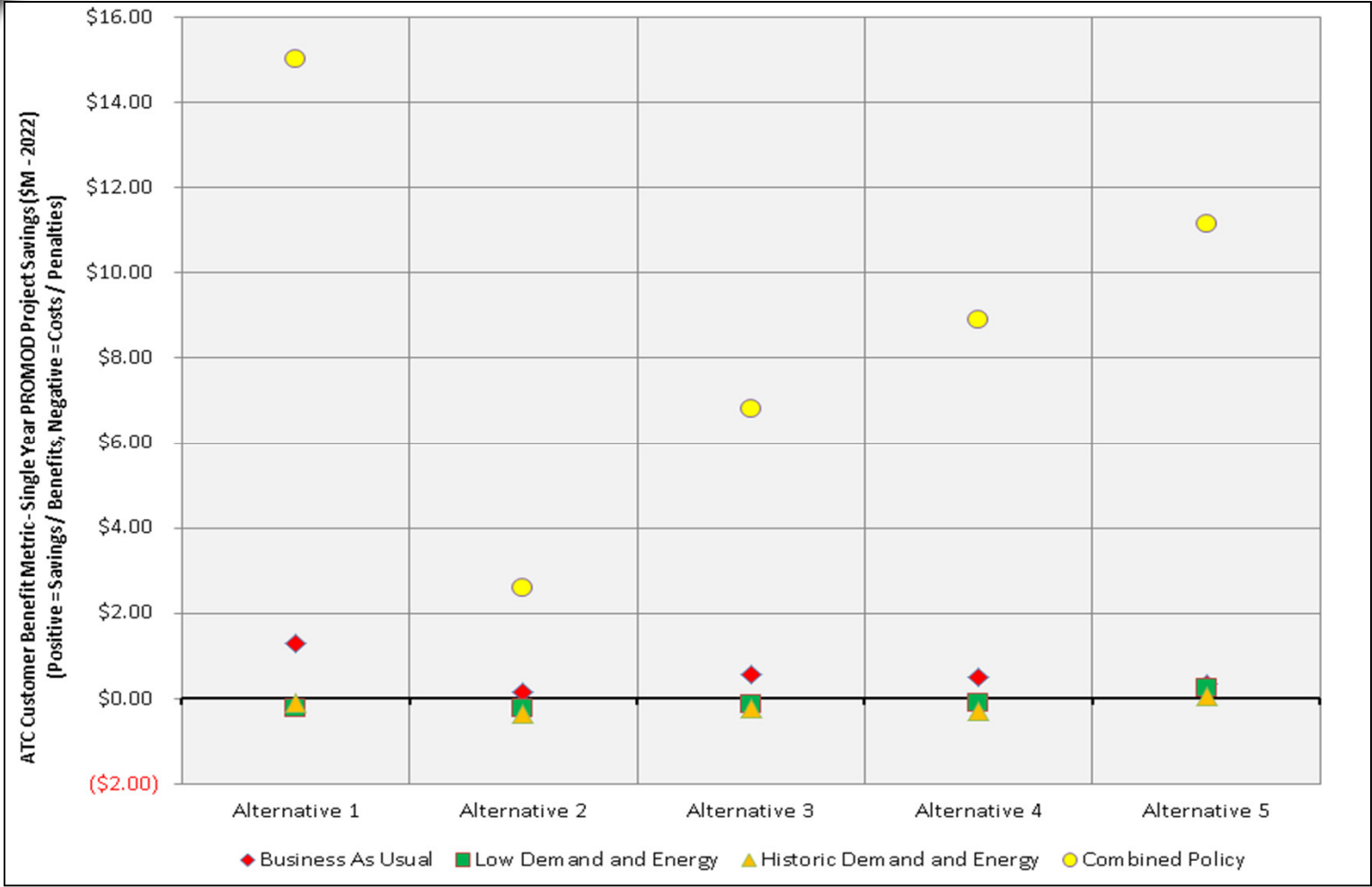
ATC Order 890 Indicative Alternatives – Milwaukee Area

Note: These Indicative Alternative Study Areas are for illustrative purposes only and do not reflect actual routes.



ATC 2022 – Analysis Results

Single-Year PROMOD Savings Milwaukee 138 kV Area

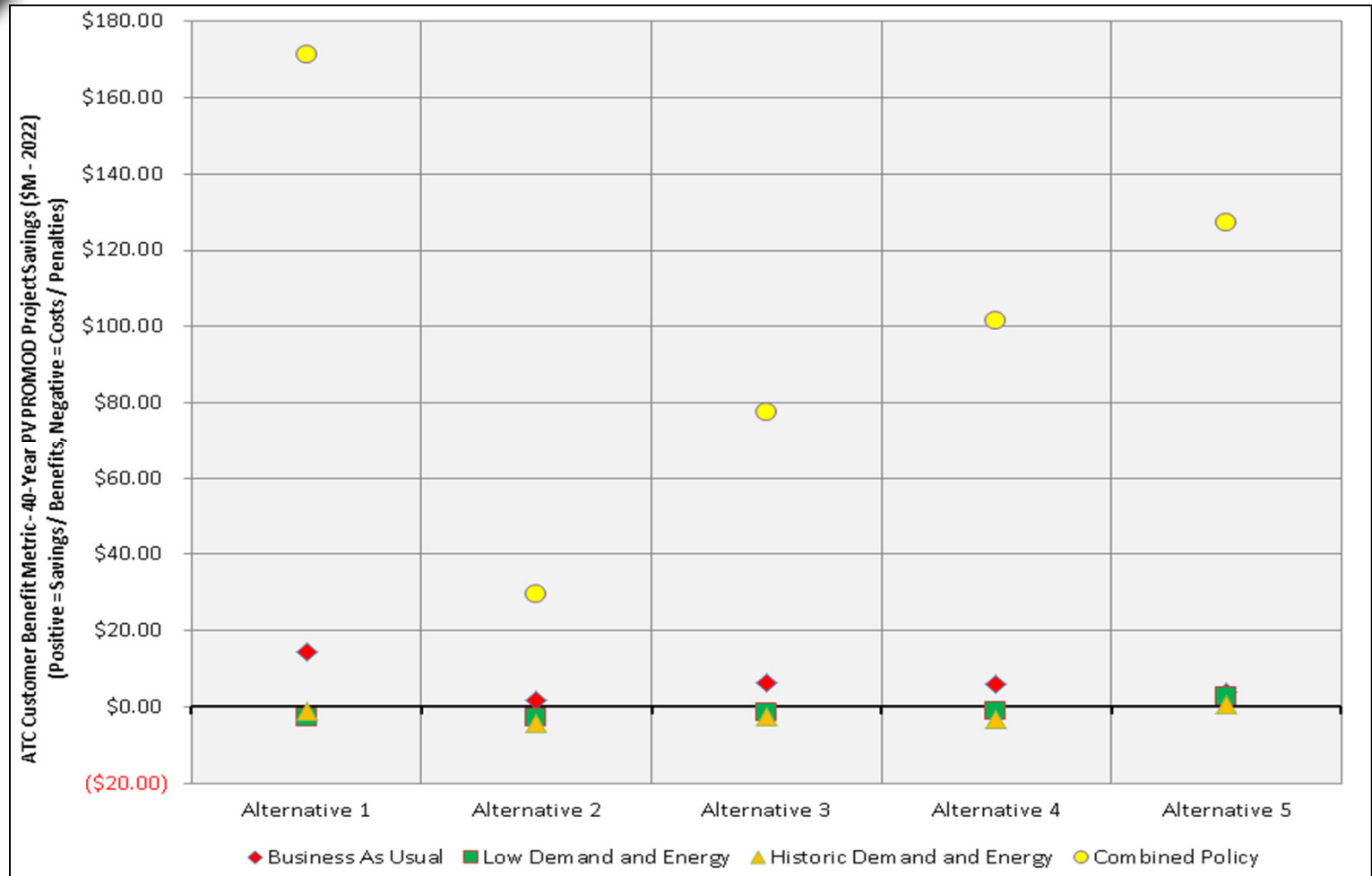




ATC 2022 – Analysis Results

40-Year Present Value PROMOD Savings

Milwaukee 138 kV Area



ATC 2022 – Analysis Results Milwaukee Area

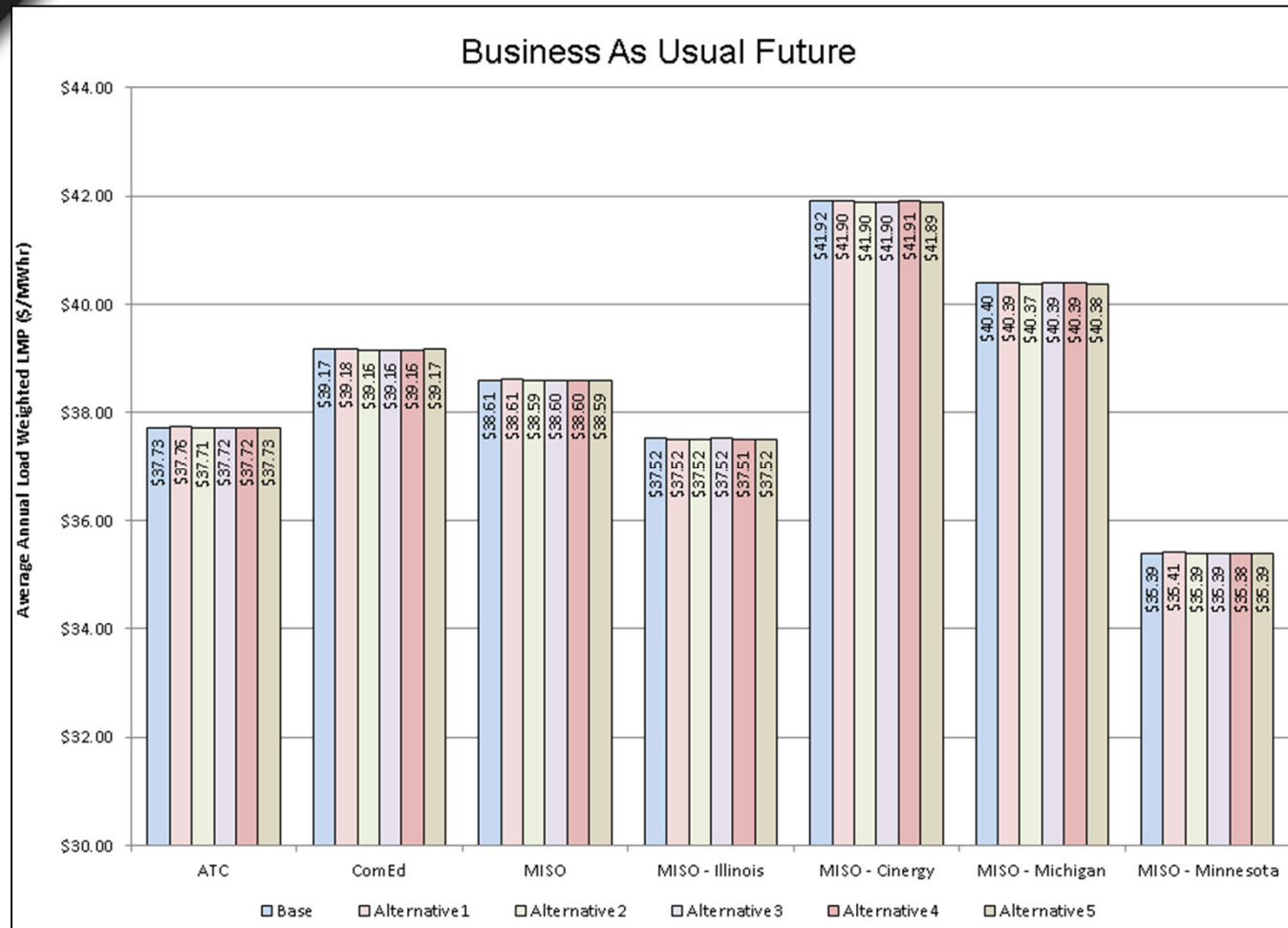
Project Alternative	ATC Benefit Impact (\$M - 2022)			
	Business As Usual	Low Demand and Energy	Historic Demand and Energy	Combined Policy
Alternative 1: Re-conductoring the Existing Granville - Butler 138 kV Line	\$1.28	(\$0.24)	(\$0.10)	\$15.03
Alternative 2: Granville - Butler 138 kV Line Circuit 2	\$0.16	(\$0.24)	(\$0.37)	\$2.60
Alternative 3: Granville - Butler - Tamarack 138 kV Line	\$0.56	(\$0.13)	(\$0.23)	\$6.80
Alternative 4: Close Fiebrantz - Cornell 138 kV Line & Adding a Series Reactor on the 138 kV Line	\$0.51	(\$0.10)	(\$0.29)	\$8.89
Alternative 5: Granville - Arcadian - Bluemound 345 kV Loop	\$0.33	\$0.24	\$0.06	\$11.14

(\$) = Costs / Penalties

\$ = Savings / Benefits

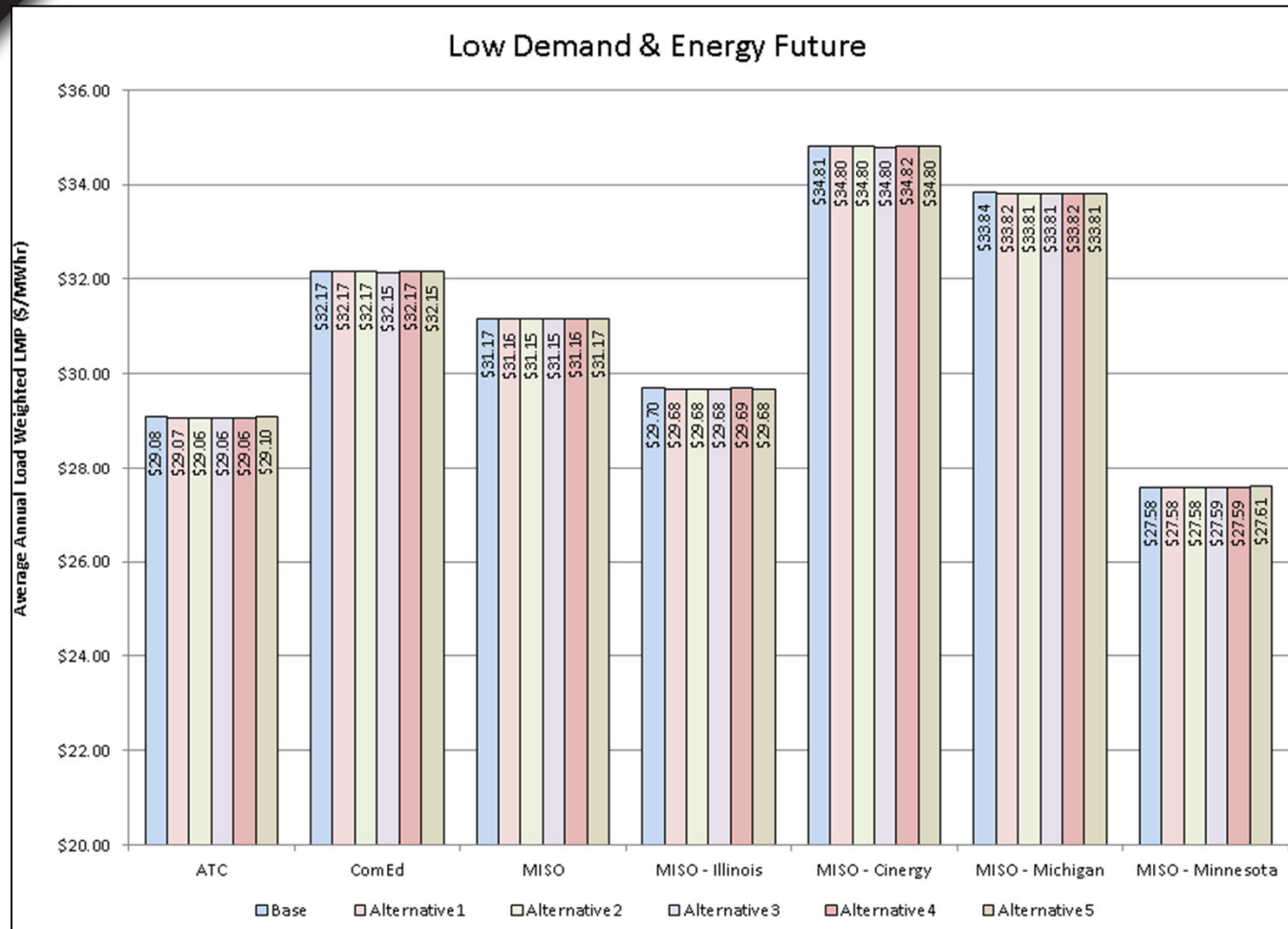
ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



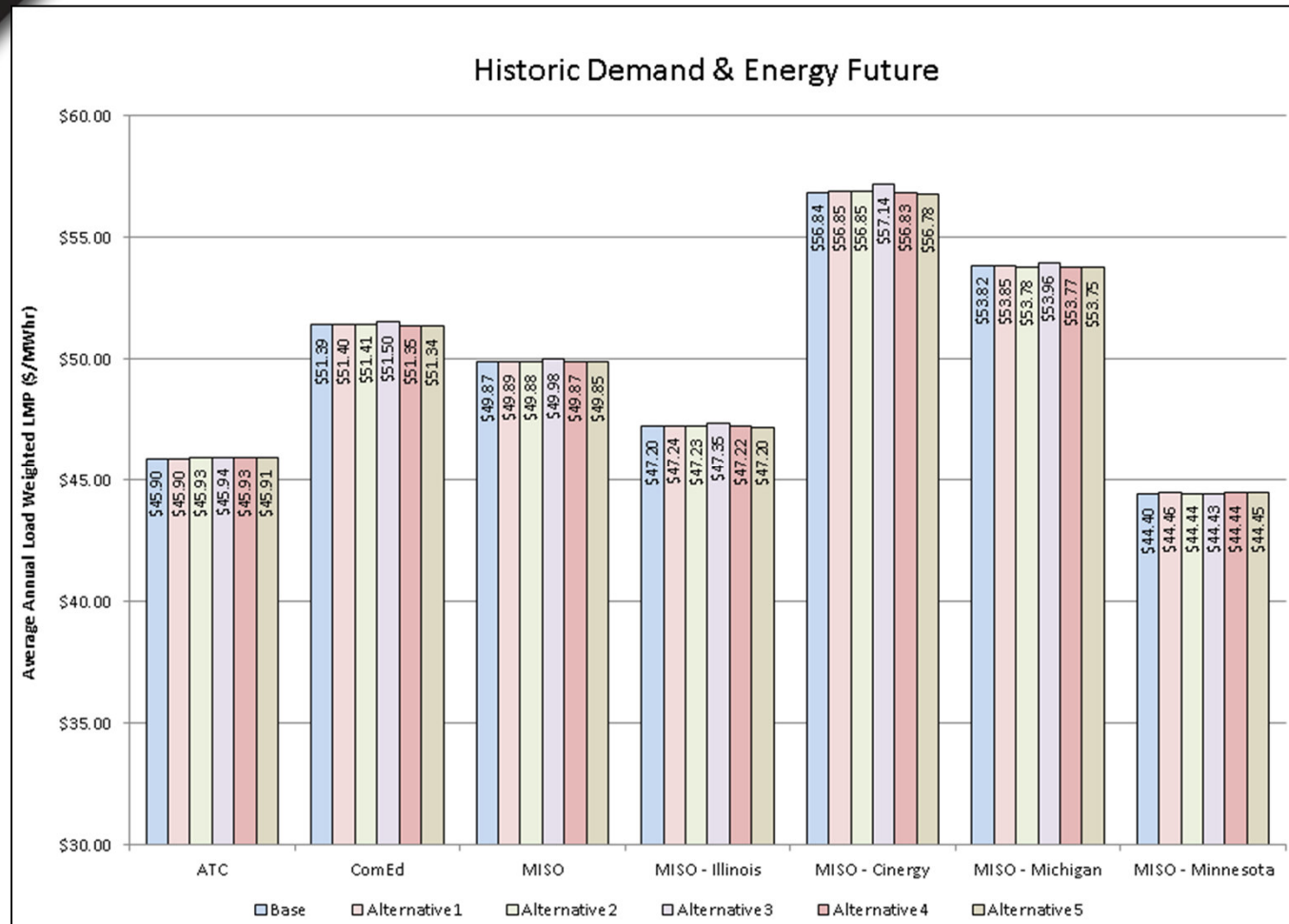
ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



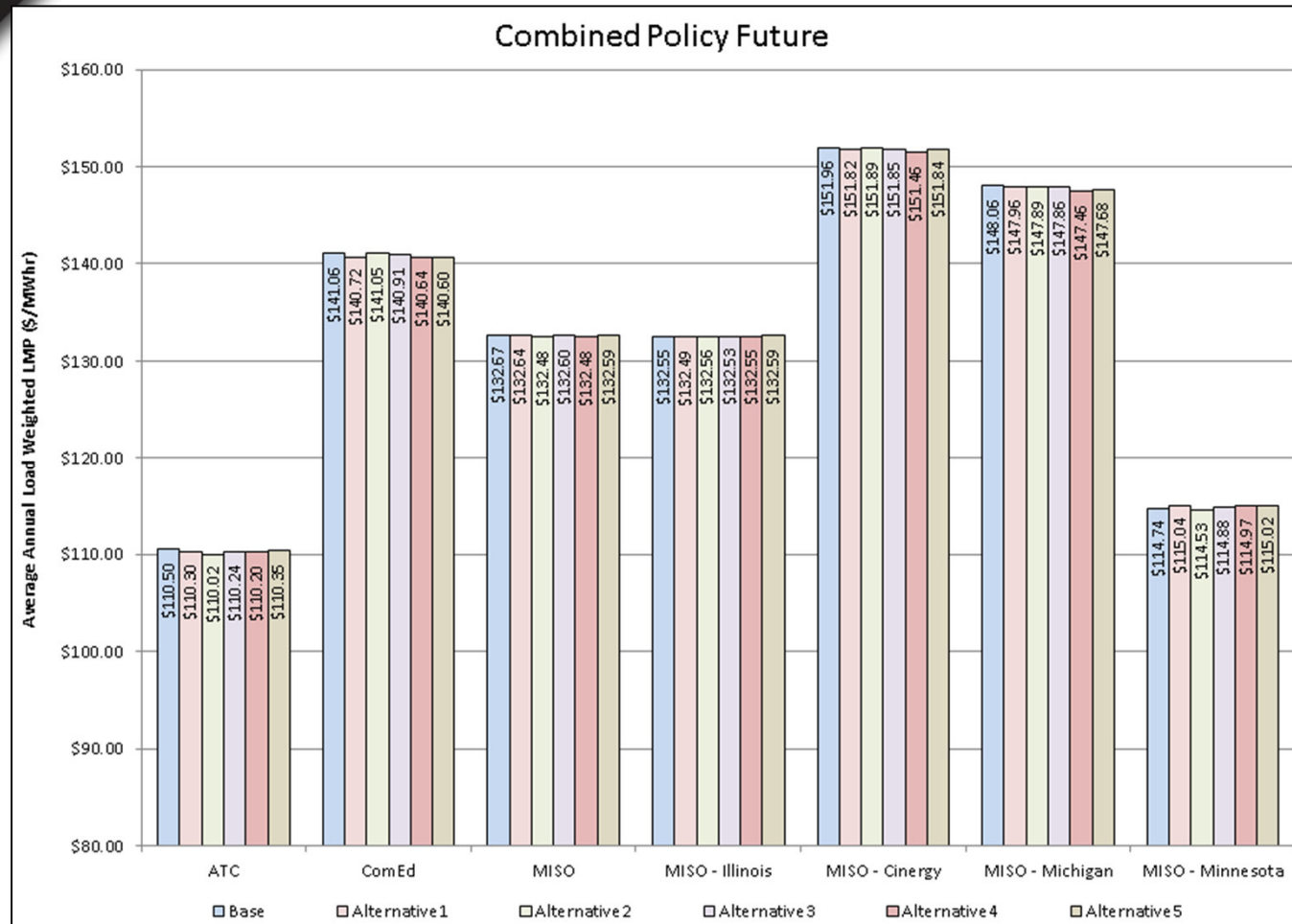
ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



ATC 2022 – Analysis Results

Load-Weighted Hub LMPs



ATC 2022 – Analysis Results

Congestion Report

Business As Usual Future						
Constraints	Annual Binding Hours					
	Base	Alternative1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Pleasant Prairie - Zion 345 kV Line	761	765	775	785	785	779
Pleasant Prairie - Racine 345 kV Line	173	185	181	185	183	189
Butler - Granville 138 kV Line	96	0	0	7	0	28
Butler - Bluemound 138 kV Ckt2 Line	0	2	72	42	0	0
Granville - Tosa 138 kV Line	0	3	0	0	0	0
Cornel - Febrantz 138 kV	0	0	0	0	41	0
Albers - Paris 138 kV Line	12	12	12	13	15	12

ATC 2022 – Analysis Results

Congestion Report



Low Demand and Energy Future						
Constraints	Annual Binding Hours					
	Base	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Pleasant Prairie - Zion 345 kV Line	691	683	682	678	679	684
Pleasant Prairie - Racine 345 kV Line	134	136	133	137	147	137
Butler - Granville 138 kV Line	5	0	0	0	0	0
Butler - Bluemound 138 kV Ckt2 Line	3	5	17	21	0	0

ATC 2022 – Analysis Results

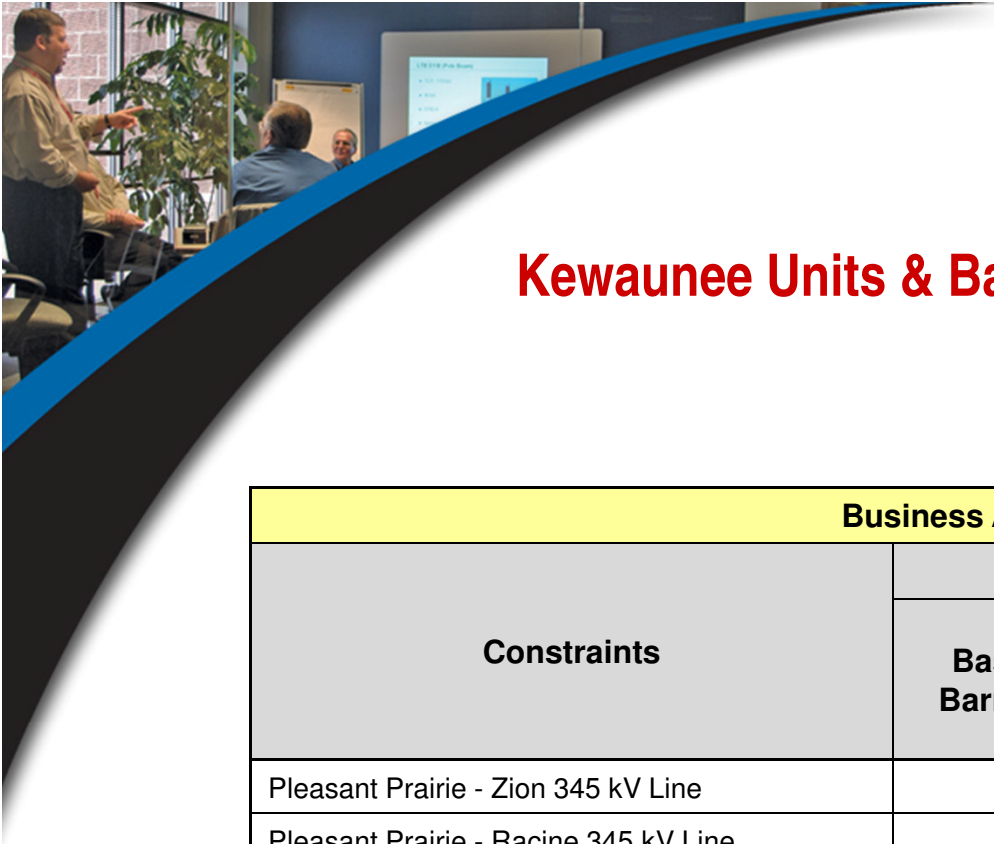
Congestion Report

Historic Demand and Energy Future						
Constraints	Annual Binding Hours					
	Base	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Pleasant Prairie - Zion 345 kV Line	1443	1429	1447	1443	1439	1441
Pleasant Prairie - Racine 345 kV Line	296	297	304	295	301	309
Granville - Arcadian 345 kV Line	0	6	0	1	0	0
Butler - Granville 138 kV Line	69	0	0	13	0	13
Butler - Bluemound 138 kV Ckt2 Line	0	0	35	8	0	0
Cornel - Febrantz 138 kV	0	0	0	0	7	0
Albers - Paris 138 kV Line	9	8	5	8	8	11
Oak Creek - St. Rita	3	2	2	3	2	0

ATC 2022 – Analysis Results

Congestion Report

Combined Policy Future						
Constraints	Annual Binding Hours					
	Base	Alternative1	Alternative2	Alternative3	Alternative4	Alternative5
Pleasant Prairie - Zion 345 kV Line	4961	5065	4981	5020	4995	5024
Pleasant Prairie - Racine 345 kV Line	2222	2443	2345	2386	2469	2432
Granville - Arcadian 345 kV Line	0	94	0	1	7	0
Butler - Granville 138 kV Line	1269	100	0	76	0	471
Butler - Bluemound 138 kV Ckt2 Line	0	121	970	681	0	0
Cornel - Febrantz 138 kV	0	0	0	0	573	0
Albers - Paris 138 kV Line	76	51	67	59	56	63



Sensitivity Analysis

Kewaunee Units & Barnhart Branch – Branch River Project

Business As Usual Future		
Constraints	Annual Binding Hours	
	Base – W Kewaunee & Barnhart – Branch River	Base – WO Kewaunee & Barnhart – Branch River
Pleasant Prairie - Zion 345 kV Line	761	506
Pleasant Prairie - Racine 345 kV Line	173	110
Butler - Granville 138 kV Line	96	30
Butler - Bluemound 138 kV Ckt2 Line	0	1
Albers - Paris 138 kV Line	12	10
Petenwell – Badger West 138 kV Line	286	646
Arpin 345/138 kV Transformer	1	2



Additional Alternatives Considered

- Granville – Bluemound 345 kV Line
 - Potential benefits are not adequate to justify a 345 kV transmission line
- Closing the Cornell – Fiebrantz 138 kV Line
 - Causes significant amount of congestion



Next Steps

- Develop Detailed Cost Estimates
- Develop Benefit / Cost Ratios
- Additional Alternative and Sensitivity Analysis Based on Feedback from Stakeholder

A graphic in the top-left corner features a white wind turbine against a blue sky, partially obscured by a thick, curved black and blue swoosh that extends across the top of the slide.

Next Steps Preliminary Results

These are preliminary results as of the date of this presentation. ATC's planning analysis is a continuing process, and ATC will provide updated results for these projects as appropriate. ATC may also change its planning assumptions or methodology with respect to these projects, and any such change may alter the results of its analysis. ATC's definitive planning analysis would be set forth in a potential future regulatory proceeding (if necessary) for these projects.



Questions?

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