Synapse
Energy Economics, Inc.

Midwest Wind and Transmission:
Rate Impacts Analysis

Prepared for Americans for a Clean Energy Grid

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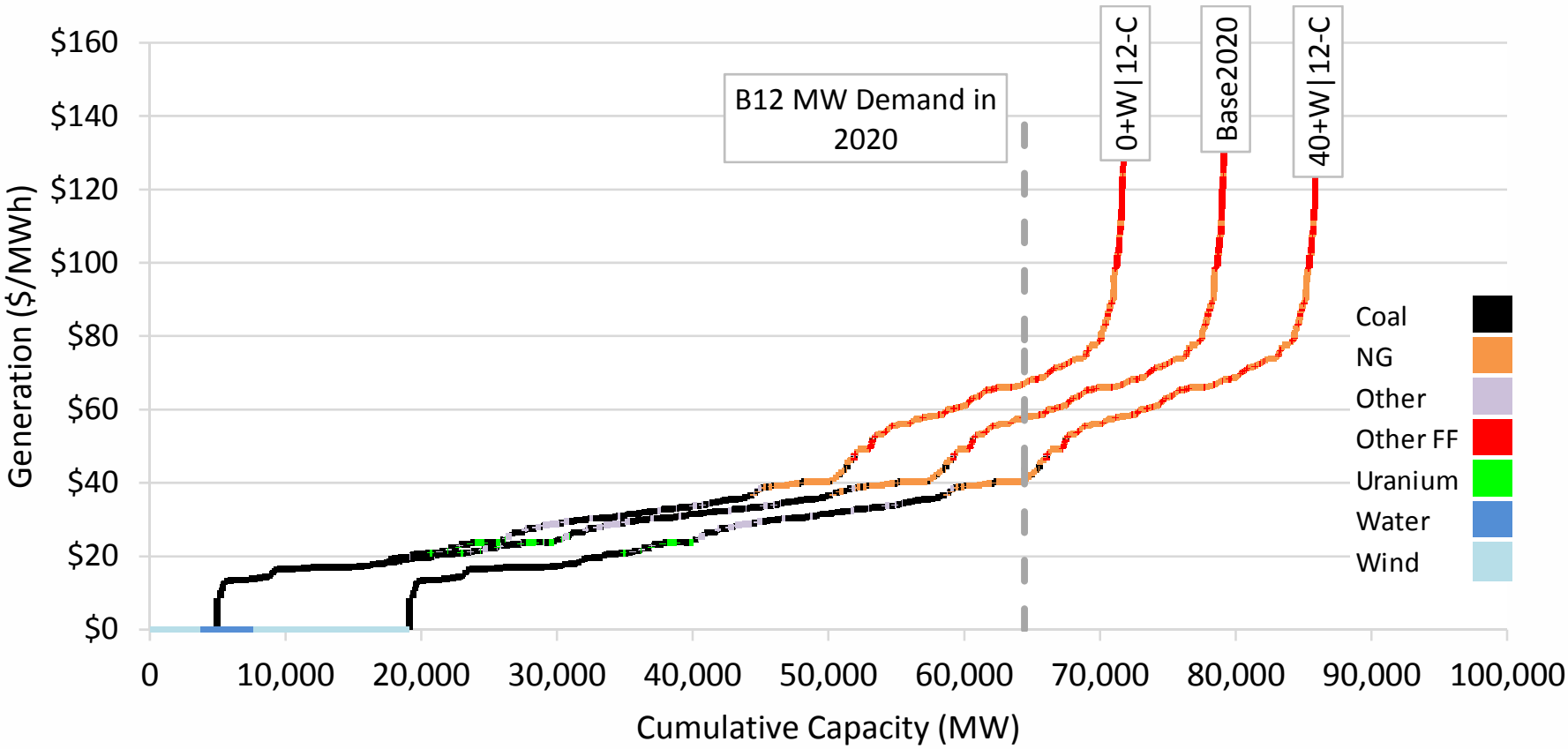
Study Background

- In restructured electricity markets, the addition of low-operating cost resources (like wind) reduces the “clearing price” for electricity (“SIPE”)
- The Midwest region has abundant wind potential, but requires transmission investments to access it
- Question: how would (a) the rate impact of transmission investments to access the wind resources, compare to (b) the price benefits of adding more wind to the generation mix?

Impact on Energy Clearing Price



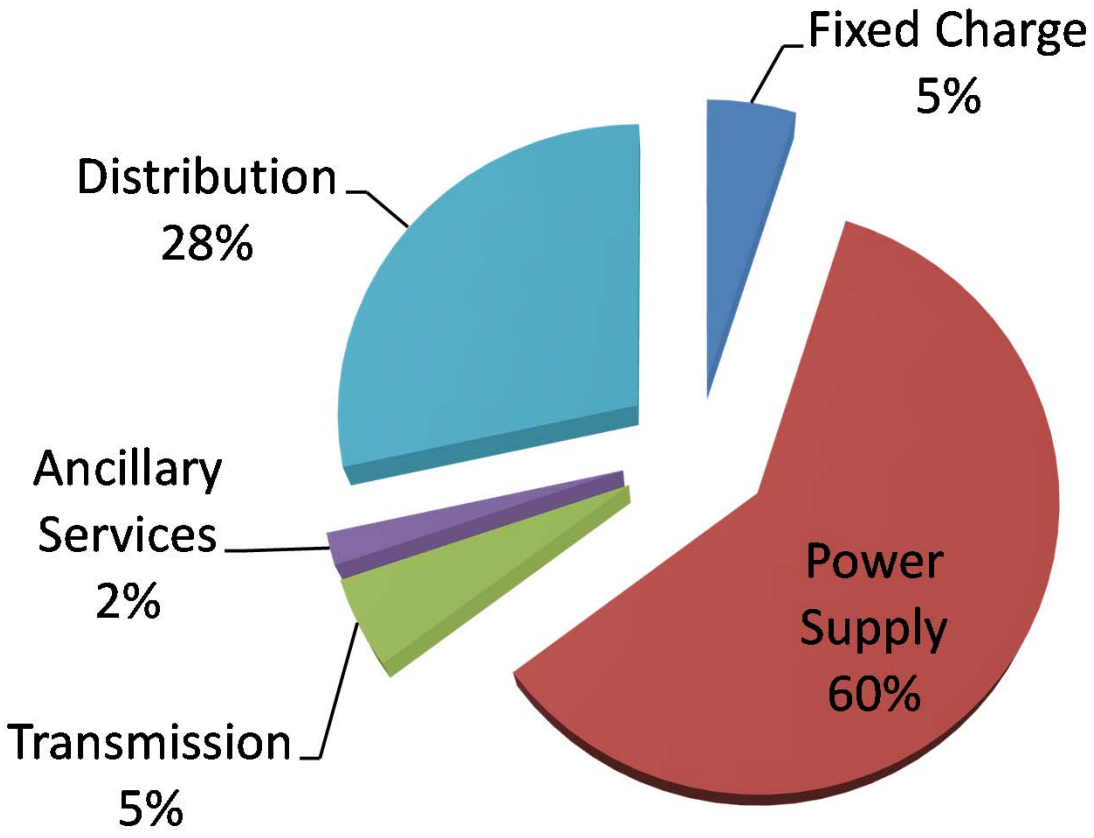
Key Findings

- Price suppression effect is supported by our analysis (and by MISO market monitor)
- This effect is predicted over all coal retirement scenarios considered
- Savings expected to far exceed the cost of required transmission investments
- Savings between $60 and $200 per year for MISO residential customer, depending on scenario.

Caveats

- Transmission cost assessment not based on specific wind requirements studies – should be taken as “indicative”
- Electric energy price is complicated function of many factors, and our model is not “optimized” to represent these
- In particular, we have not modeled the response of other market participants to the price impact shown here, which would probably reduce the annual savings over time.

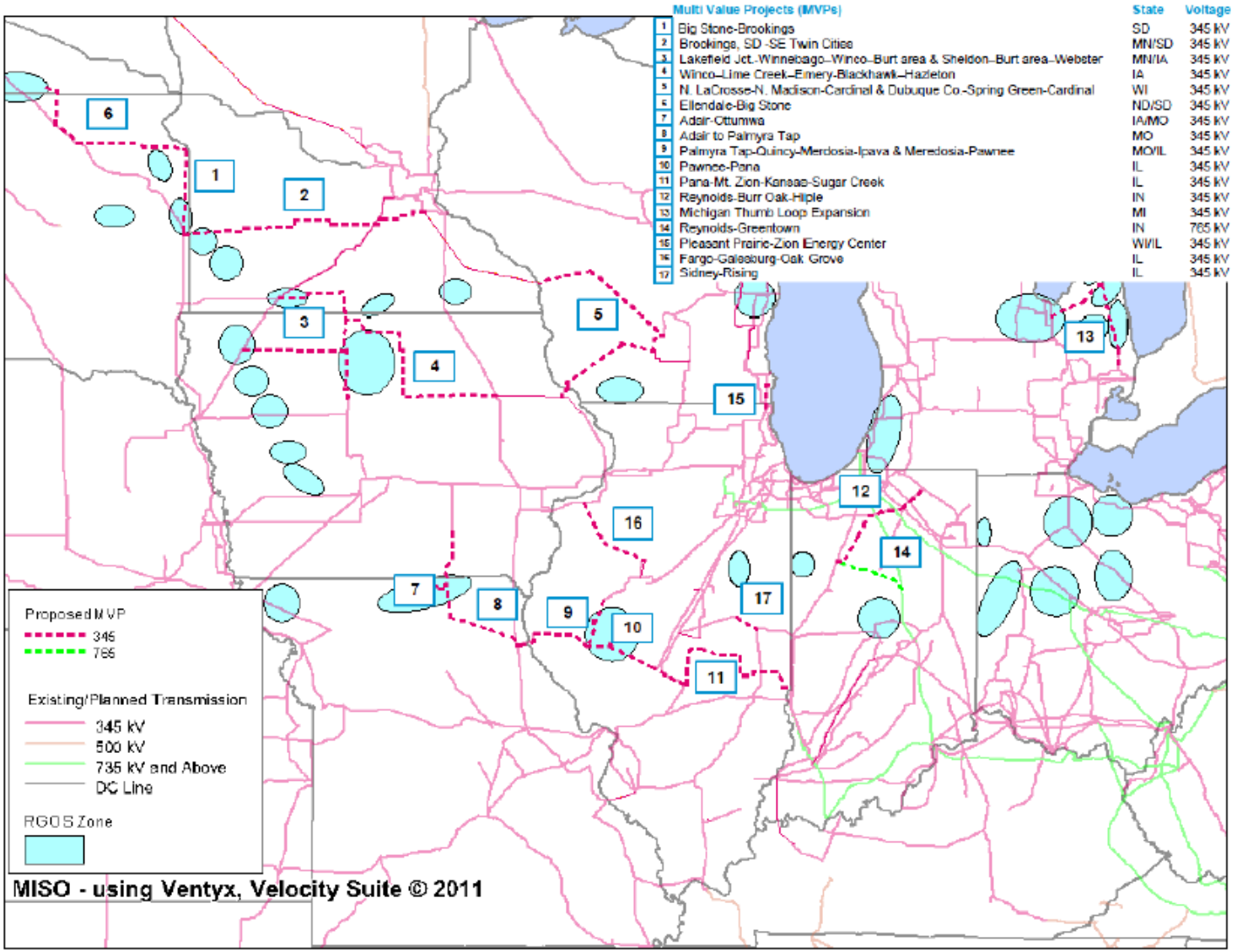
Consumers' Energy - 1000 kWh monthly bill



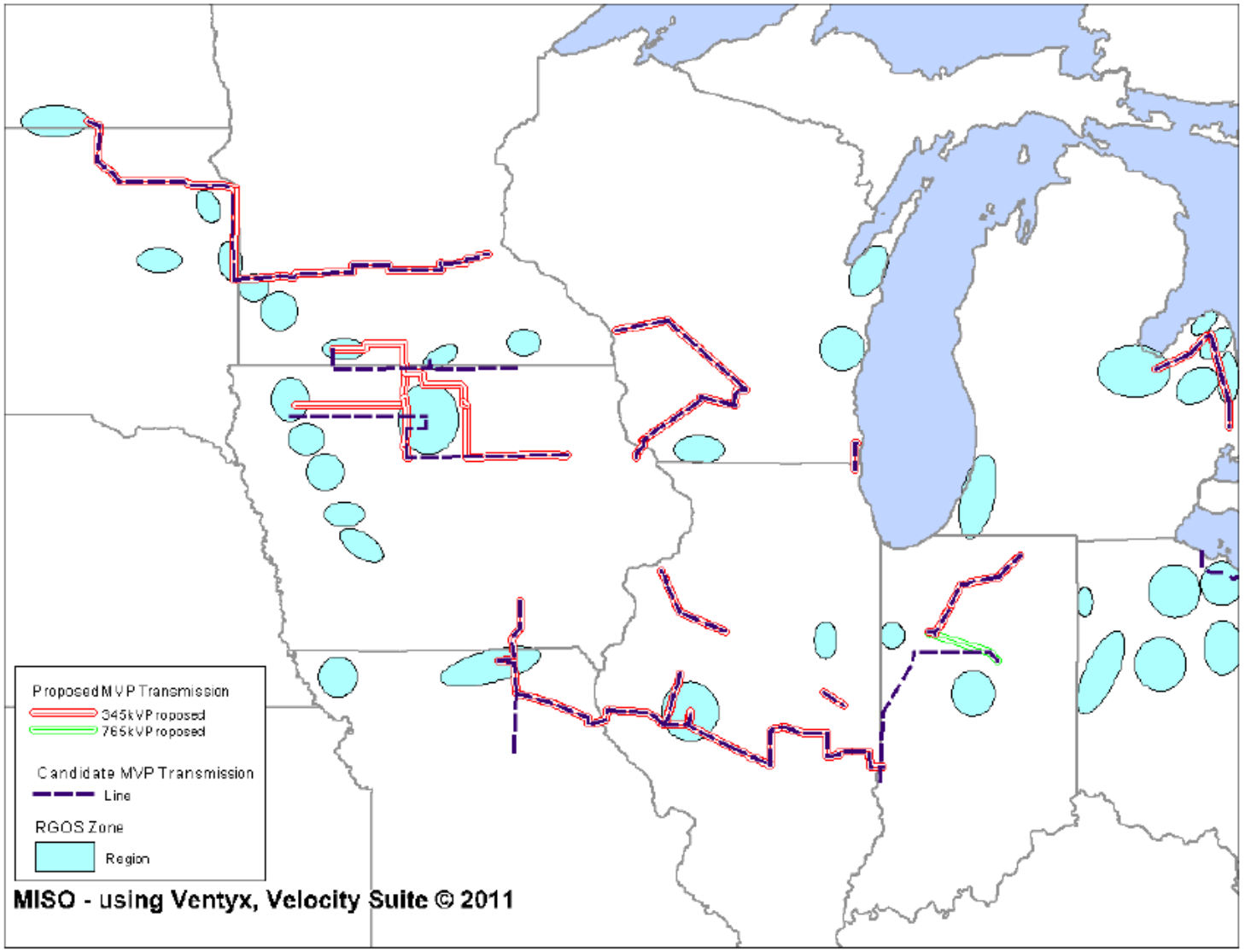
Analysis Scenarios

- **Transmission rate analysis:** three transmission scenarios, plus "MVP only" based on RGOS
- **Wind build-out scenarios:** Price effects calculated for a range of incremental wind added to MW grid
- **Coal retirement scenarios:** re-analyzed price impacts assuming 3, 12, and 23 GW of regional retirements
- *Transmission scenarios "conceptually" related to wind build-out, but not linked in our analysis.*

MISO MVP Portfolio



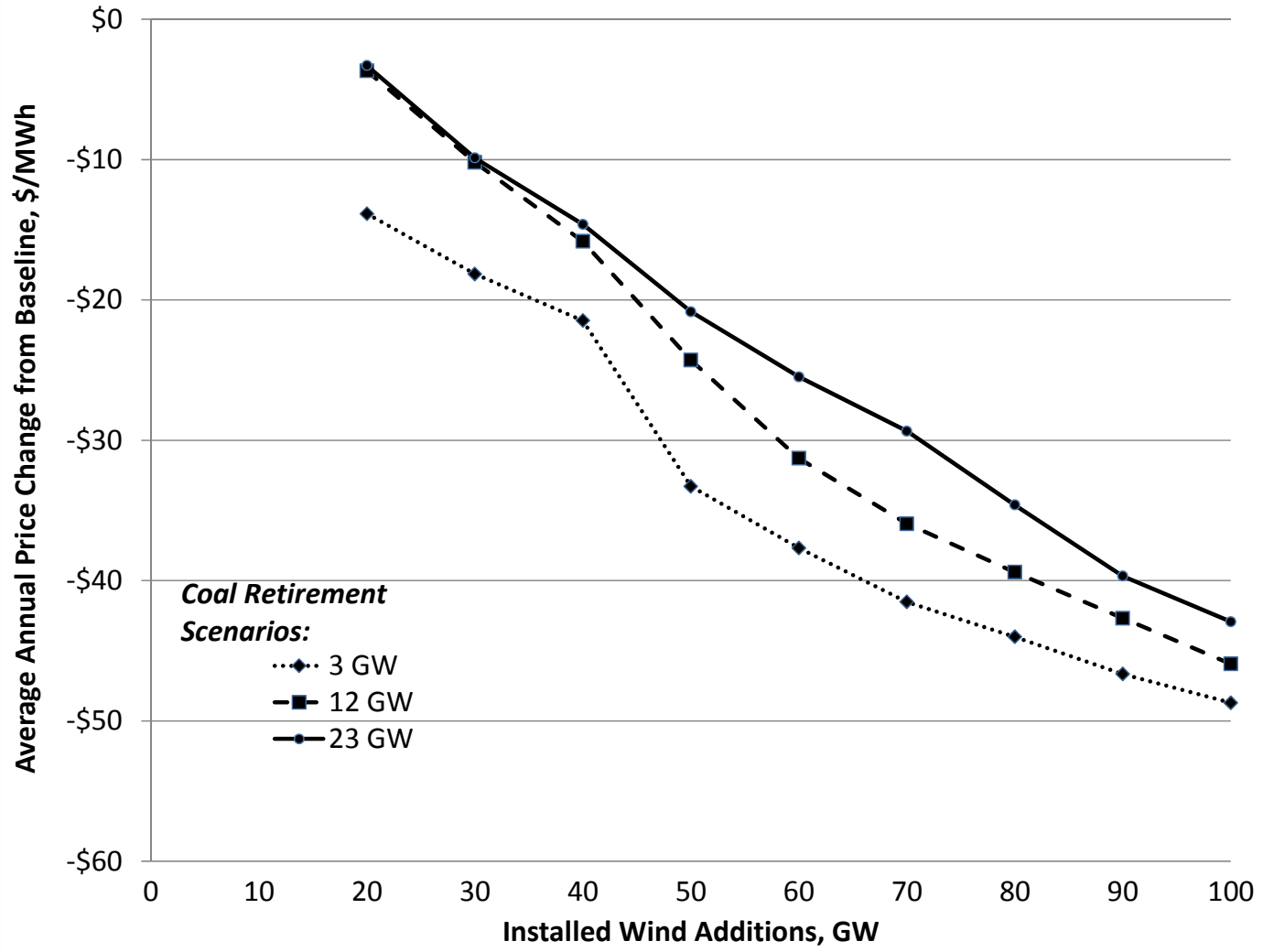
MISO Candidate vs MVP Portfolio



Transmission component Scenarios

Transmission Scenario - Cost Basis	Total Cost of New MISO Transmission "for Wind", $Billion	Transmission Rate Impact of Scenario Listed, for Year Listed, $/MWh		
		2015	2021	2031
Current MVP Only	$5.2	$1.02	$1.64	$1.28
Current MVP + Synapse Low T Expansion	$24.2	$1.02	$4.85	$6.52
Current MVP + Synapse Medium T Expansion	$31.2	$1.69	$5.93	$8.46
Current MVP + Synapse High T Expansion	$40.2	$1.76	$6.40	$11.20

Impact on Energy Clearing Price



Conclusions

- Incremental transmission build-outs can access very large amounts of high-quality wind resources in the Midwest
- Adding low-running cost resources (wind) can lead to substantial clearing price reductions in electricity markets
- Transmission costs are dwarfed by potential electricity market impacts
- Specific benefits depend on assumptions regarding contracting structures, market response, and engineering details.

