# Enchanted Rock & Singularity Energy: Collaborating to Measure Carbon Savings

As part of its acceleration mission, EIP looks for direct synergies between its portfolio companies and our Limited Partners ("LPs"). This year EIP portfolio companies Singularity Energy ("Singularity") and Enchanted Rock collaborated to understand the carbon impact of grid electricity sales from Enchanted Rock generators across ERCOT and MISO.

In Texas, Enchanted Rock's generation has similar carbon intensity compared to the ERCOT grid's marginal mix, with its large share of natural gas. In the Midwest, Singularity found that Enchanted Rock's generation emits on average 16 to 19% less CO_2 than the marginal grid during Enchanted Rock's operational hours, leading to avoided emissions between .13 and .16 tons CO_2/MWh.

Separately, EIP calculated additional avoided carbon emissions of 730 tons from Enchanted Rock's displacement of diesel generators during power outages. In addition to these displaced emissions there are large social and economic benefits from Enchanted Rock's reliable backup power.

OPERATIONAL AVOIDED EMISSION RATE FOR ENCHANTED ROCK'S MISO OPERATIONS
(TONS CO_2/MWh)

Cambium

0.130	MISO

AVERT

0.164	MISO

Nonbaseload

0.156	MISO
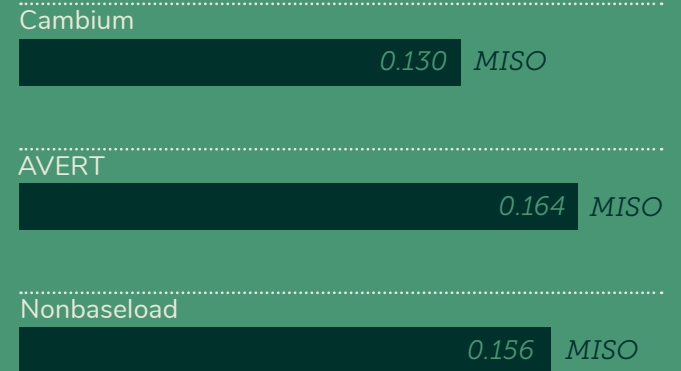
MEASURING AVOIDED EMISSIONS

Avoided emissions are an estimate of the impact of a project on electrical grid carbon emissions. Measuring this impact requires estimating hypothetical carbon emissions from grid operations without the project of interest, making it an inherently uncertain endeavor. Singularity's approach uses multiple methodologies to produce robust and defensible avoided emissions estimates.

Singularity's methodologies include Cambium, a power system model produced by the National Renewable Energy Laboratory, AVERT, a regression model produced by the EPA, and an hourly non-baseload estimate based on EPA's eGRID. Each methodology is thoroughly documented, uses published data, and is backed up by research. The application of each methodology is based on the GHG Protocol, considered the global standard for emissions reporting.

Singularity used each of these three methodologies to calculate an hourly marginal emission rate, which is the emission rate of the electricity replaced by Enchanted Rock's operations in the hours when it sells electricity back to the grid. The avoided emission rate in MISO for those hours, ie, the difference between the grid marginal emission rate and Enchanted Rock's emission rate, is shown at right. Using hourly rates is important for projects such as Enchanted Rock's, whose production is highly variable.

Working with Enchanted Rock, Singularity was able to provide insights into regional and temporal variations in their avoided emissions from grid sales.

AVOIDED EMISSIONS RATES ACROSS METHODS FOR ENCHANTED ROCK'S MISO OPERATIONS