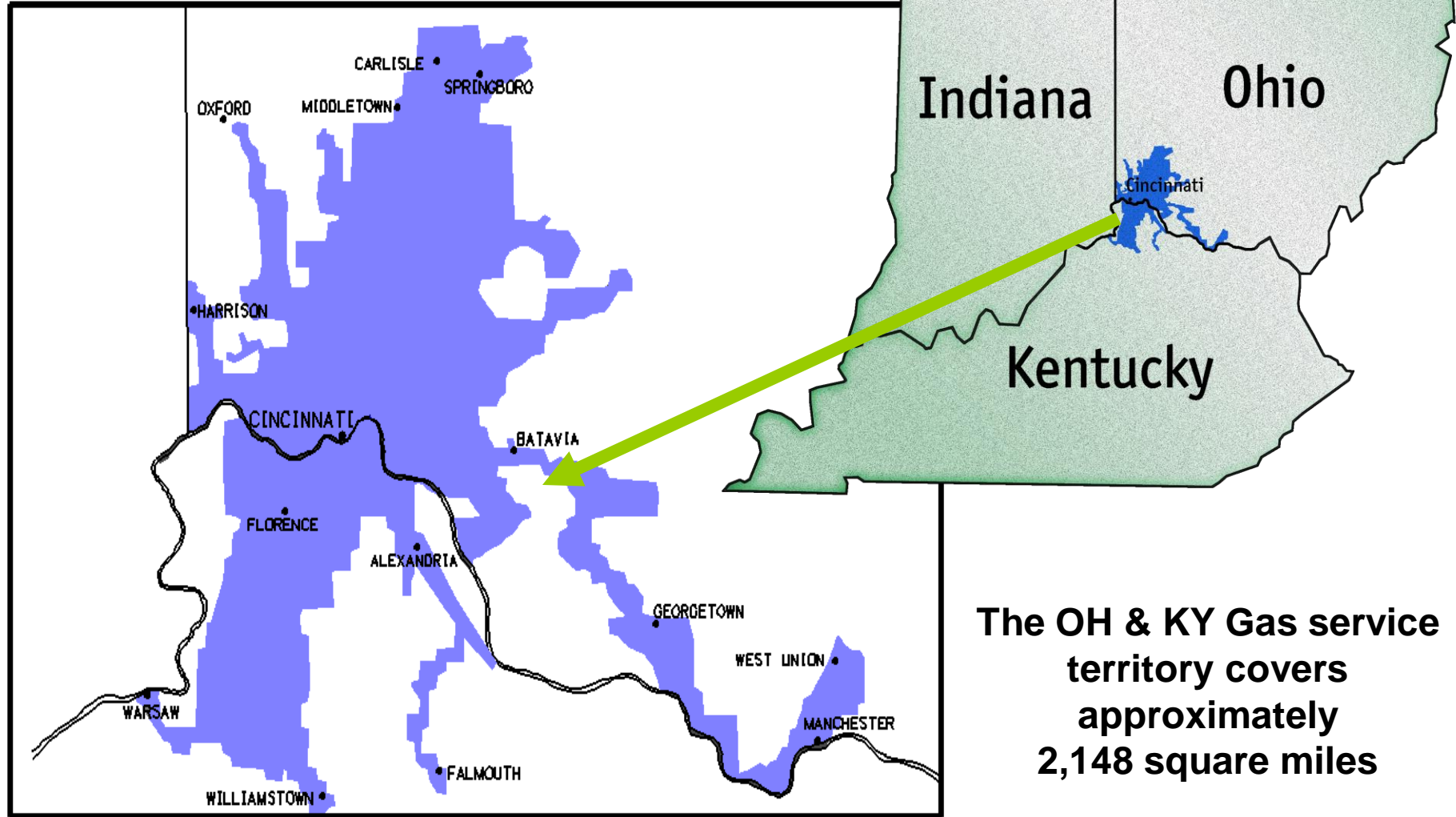


A large, abstract background image with a blue color palette. It features a dark, curved shape in the foreground on the left, and a bright, glowing blue light source on the right, creating a sense of depth and energy.

NGV Cost Benefit Analysis: A Natural Gas Utility Company Perspective

Mike Brumback

Duke Energy Gas Service Territory



The OH & KY Gas service territory covers approximately 2,148 square miles

Usual consideration: vehicles, stations, and GGE's

- Cost Factor: Vehicles
 - ~\$7K passenger
 - ~\$11K for pick-up truck
 - ~\$30 - \$50k large trucks



Usual consideration: vehicles, stations, and GGE's

- Cost Factor: Fueling Stations:
 - ~\$5 - \$6K installed home unit
 - ~\$ = custom installations with wide variation based on size and fill speed
 - ~\$1 MM + for large fast-fill station



Usual consideration: vehicles, stations, and GGE's

- Benefit from GGE's:
 - Variable difference between gasoline/diesel and natural gas
 - Often estimated at ~\$1.50 to over \$2.50/Gal
 - Presentations often end here....however



Potential gas utility costs should also be included

- Utility Infrastructure Cost Factor:
 - Not sufficient to just have gas at the site
 - Pressure and hourly throughput
 - Various Pressures: $\frac{1}{4}$ to 25 psi main, est. cost is ~\$300 - \$500K/ mile
 - Fast fill pressure preference is min ~35 psi cost is ~\$1 MM/ mile, or more
 - Does the utility peak-shave with propane air?



Ask about utility peak shaving with propane air

- Some utilities, including Duke Energy, blend propane/air into their natural gas for peak-shaving. Approximately $\frac{1}{2}$ of gas distribution system subject to P/A at various blends.
- Gas Research Institute : Fuel Issues For Gas Engines and NGVs (1993 Windsor Workshop on Alternative Fuels)
 - High levels of propane and low temperatures can result in liquid hydrocarbon condensation, which in turn can affect station and vehicle operation.

Utility Perspective Recommendations

- Recommendations:
 - Contact the utility early with specifications, prior to contracts or purchases
 - Utility will need (1) pressure required, and (2) hourly throughput
 - If main extension is needed, utility also needs est. annual volume of gas used
 - Add utility infrastructure costs
 - Add utility gas delivery costs (not just gas market prices)
 - Add utility electric costs
 - **Please do use NGVs** - with full knowledge of costs

Duke Energy Action Plan re NGVs

- Survey market
 - Significant potential
 - High GGE fleet customers = #1
- Station installation: customer demand will drive
 - Duke is not installing public stations at this time
- Tariff preparation: approved
- Check for propane/air:
 - Make public notification regarding P/A: on website
 - Develop system maps
- Outreach: In progress, meeting with large fleet customers
- Status: Three private stations incl. Duke, others under review

Duke Energy Perspective re NGV market

Questions?