

City of Charlottesville – Decarbonization Study

Dr. Hua Fang

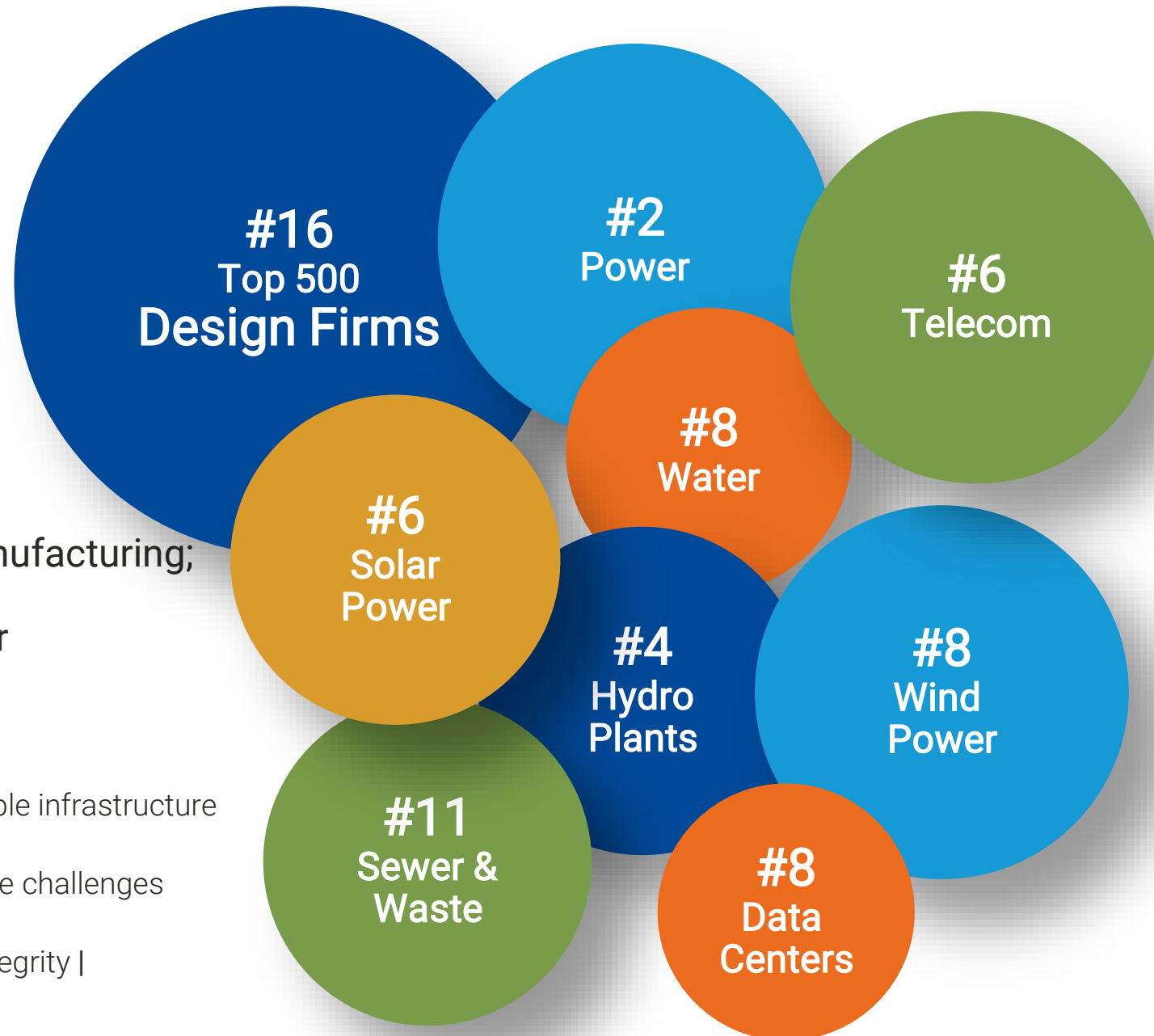
Managing Director – Global Advisory

Today's Discussion

- Introduction to Black & Veatch
- Decarbonization Study – Goals and Objectives
- Study Scope of Work and Timeline
- Questions/Answers

Black & Veatch Today

- 9,200+ professionals in 120+ offices
- Headquarters in Overland Park, Kansas, USA
- Employee Stock Ownership Plan structure
- Projects in 100+ countries on six continents
- \$4.0 billion in 2022 revenue
- Sectors
 - Commercial; Governments; Industrial & Manufacturing; Mining; Gas, Fuels, & Chemicals; Power; Telecommunications; Transportation; Water



Mission: *Why we exist*

Building a world of difference through innovation in sustainable infrastructure

Vision: *What future we aspire to achieve*

We work relentlessly to solve humanity's critical infrastructure challenges

Values: *What we believe and how we behave*

Safety | Accountability | Collaboration | Entrepreneurship | Integrity | Ownership | Respect

Current Engineering News-Record rankings.

Strategic Advisory

Key Business Areas and Primary Solution Offerings



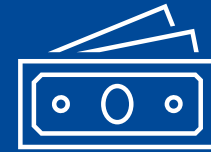
Strategy & Planning

- Decarbonization Strategic Planning
- Integrated Resource Planning
- Clean Power Procurement
- Transmission Strategy and Planning
- LNG and Other Fuels Strategic Planning
- Hydrogen Fuels Strategic Planning
- Transportation Electrification Strategic Planning
- Grid Mod, DER Integration Strategic Planning
- Program Management (PMO)



Rates & Regulatory

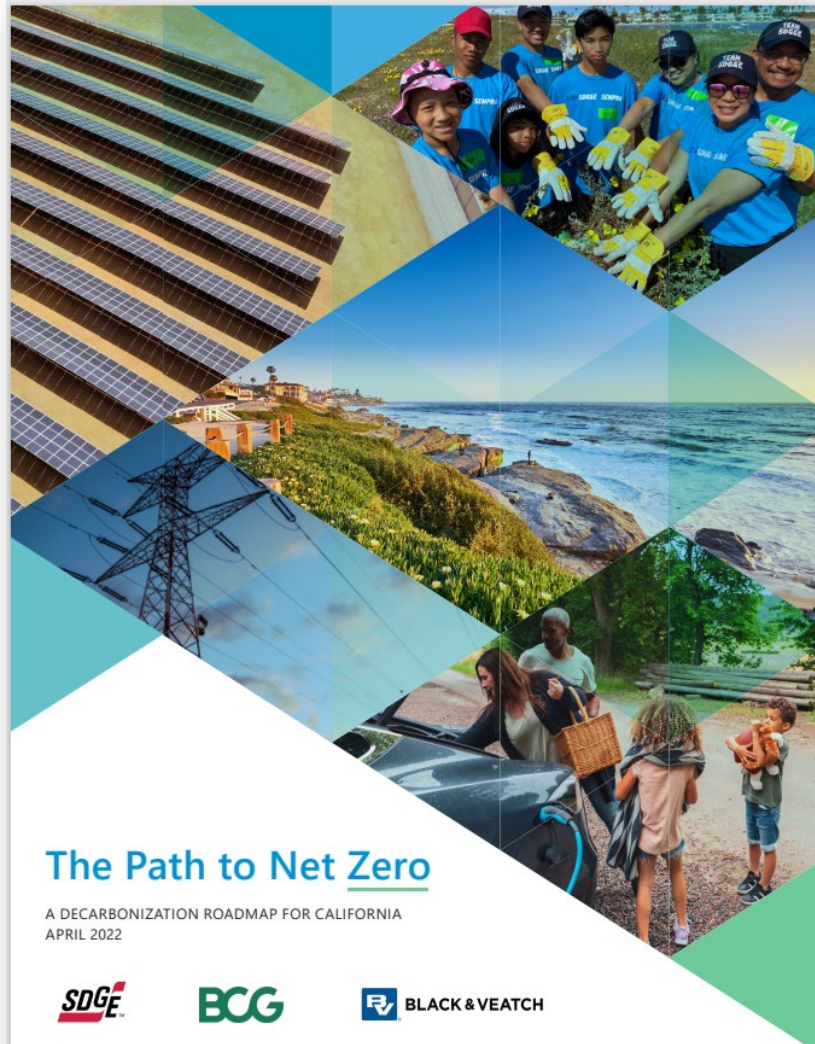
- Financial modeling and rate design for public power entities
- FERC and State Regulatory Support
- Performance-Based and Infrastructure Ratemaking
- Alternative Regulation Services
- Financial Planning, Cost of Service, and Bond Feasibility Studies
- Stormwater Utility Development and Implementation Support
- Business Operations Reviews

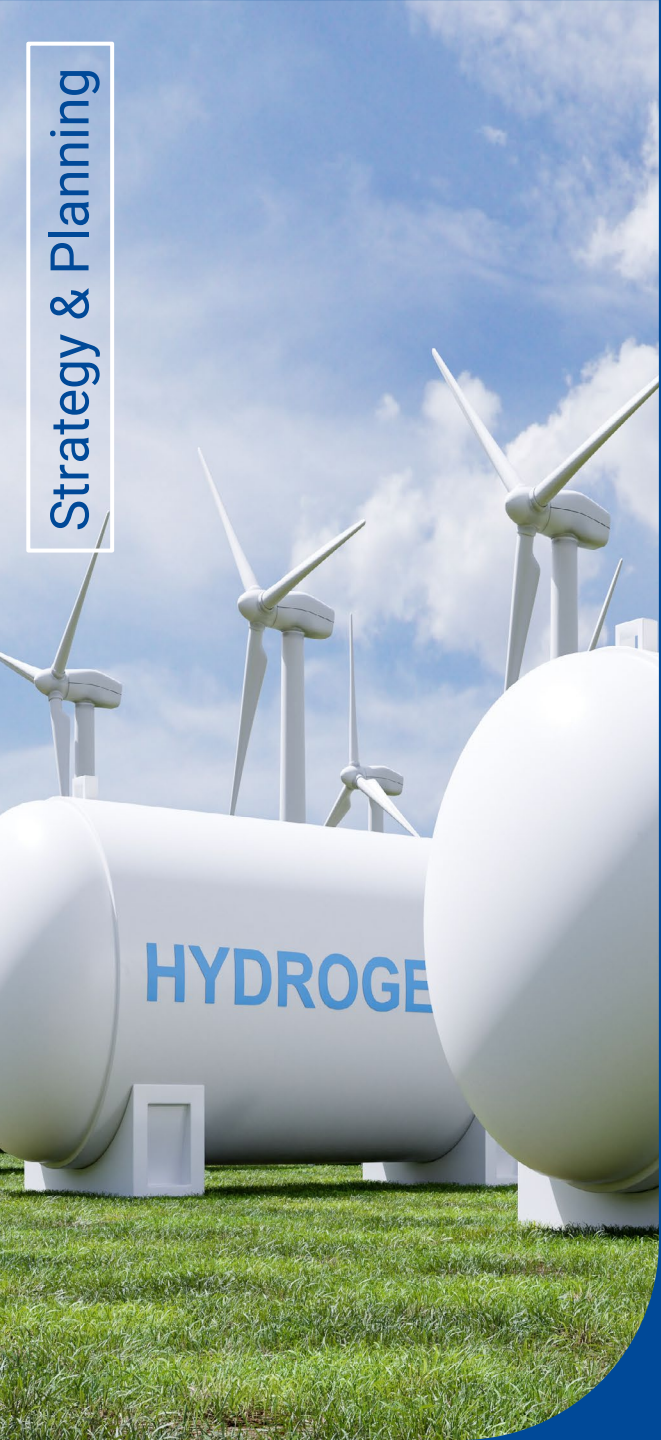


Transaction Services

- Independent Engineering / Technical Due Diligence
- Restructuring Advisory Support
- Construction and Operations Monitoring
- Project Development and Valuations
- Electricity and Fuel Price Forecasting

Black & Veatch Strategy & Planning – Decarbonization Study





Hydrogen Hub Prefeasibility Study

Hydrogen Hub Developer

Client Need

- A prefeasibility assessment and high-level cost estimate for a hydrogen hub capable of producing a large amount of hydrogen from electrolysis using renewable energy resources and guidance on energy requirements and energy production profile assessment to achieve a sustainable capacity factor of the hydrogen production facility.

Value Delivered

- A successfully designed hydrogen hub that optimizes energy sources, hydrogen production, storage, and transportation technologies.

Hydrogen Blending Strategy and Assessment

Mid-West Gas Utility

Client Need

- Achieving a hydrogen blending goal as part of its decarbonization plan and needed guidance on engineering, operational and other system requirements for blending hydrogen into its system and implementation strategies to reach the blending objective.

Value Delivered

- Assisted Client in identifying the most appropriate strategies to achieve blending goals.
- Helped Client reach the second phase towards successful blending operation.



Fleet Electrification Strategy

Entergy

Client Need

- Prepare for and evaluate the business opportunities associated with fleet electrification within their service territory and to understand their role in building and providing infrastructure to those fleets.

Value Delivered

- Provided a robust business case and strategy for entering the fleet electrification market that best positioned Entergy for immediate and long-term success. Included customer segmentation, market assessment, risk assessment, utility revenue requirements, and competitive analysis to guide their decisions around establishing the business.

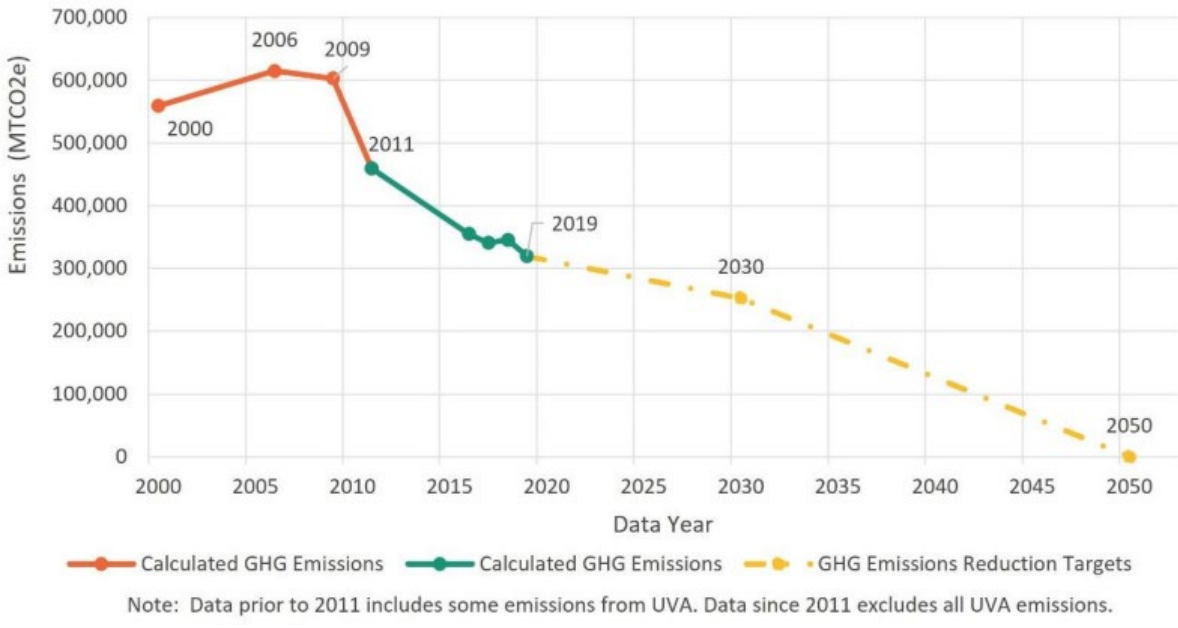


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Decarbonization Study – Goals and Objectives

Charlottesville GHG Emissions
(Total by Year)



City of Charlottesville Goal:

- A 45% reduction in community-wide greenhouse gas emissions by 2030 based on the 2011 inventory year
- Carbon neutrality by 2050

Study Objective:

- Identify and evaluate potential solutions for the gas utility to align with the community’s greenhouse gas reduction goals

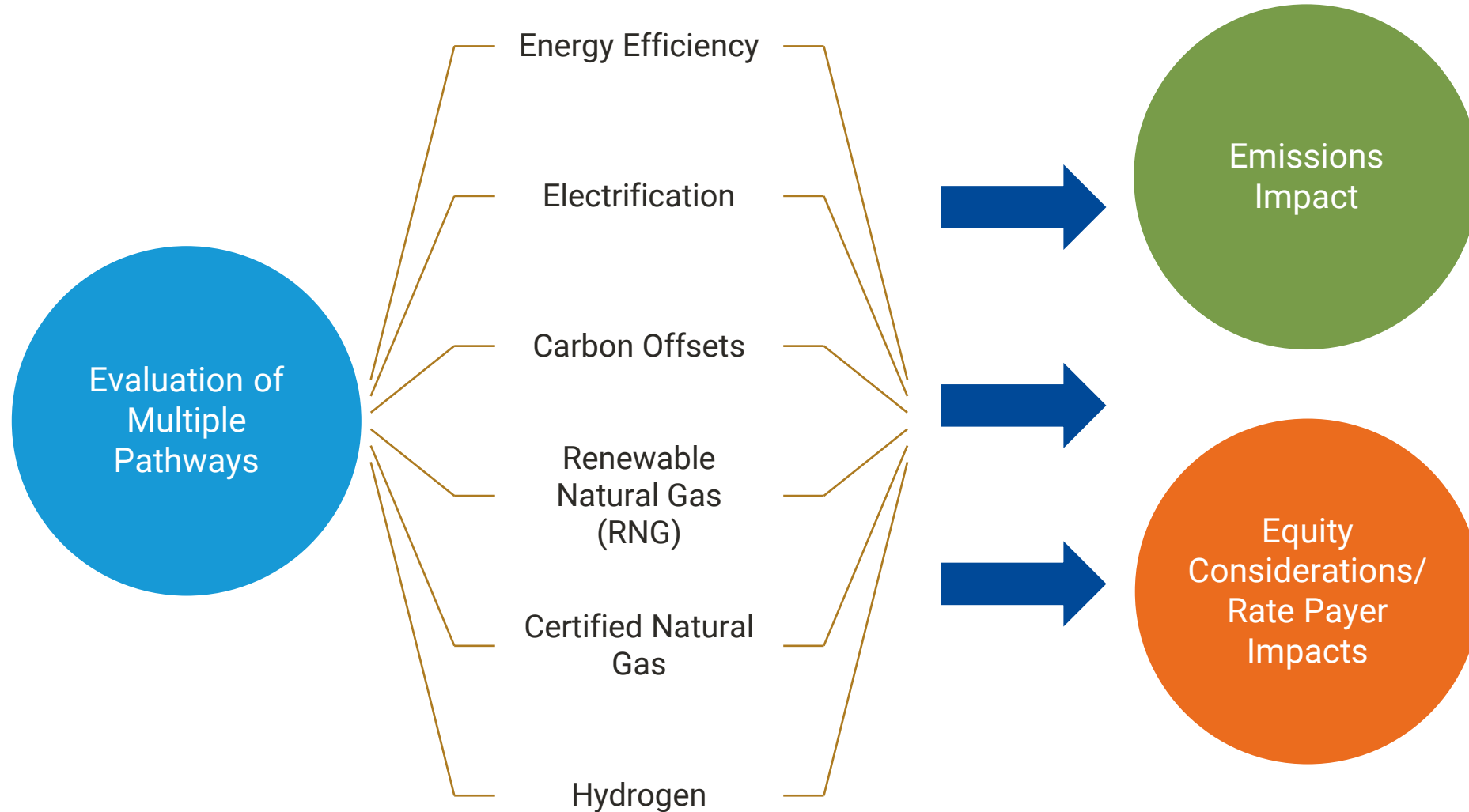
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- **Scope of Work and Timeline**
- Questions/Answers

Project Scope and Timeline

- **Legality**
 - Support legal review of discontinuing natural gas distribution operations and new connections
- **Utility System Modeling and Evaluation of Different Pathways**
 - Energy Efficiency
 - Electrification
 - Carbon Offsets
 - Renewable natural gas (RNG)
 - Certified natural gas
 - Hydrogen
- **Financial Impact on Customers (Equity Impact)**
- **Evaluate Gas Utility Operations and Energy Efficiency Programs and propose recommendations**
- **Timeline 1 year to complete**

Study Focus and Approach





Questions?



Contact Us

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