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Hydrogen, Natural Gas, LNG, Power, Renewables,

Brad Williams leads Spitfire Advisors, working with clients to create business strategies and develop commercial transactions while providing hands-on leadership to fulfill those plans. Creating value through teamwork, exceptional creativity and effective execution. Experience that works with you and for you. Brad brings over thirty years of practical experience to every engagement including asset development, due diligence, technical reviews, project feasibilities, M&A transactions, project management, financing, and EPC contracting. We create value for our clients by providing baseline facts and data with strategic perspectives and effective implementation of business plans with a team approach. Spitfire Advisors contributes a high level of expertise and works closely with clients on an as-needed when-needed basis, providing customized project work and commercial business solutions tailored to each client's specific needs. Work experience has included working 10 years overseas in India, the FSU, Indonesia, China, the E.U., South America and the Caribbean. We participate in the global marketplace, following changing markets and economic drivers which motivate commercial investments.



Experience with the Hydrogen Marketplace, Infrastructure and Commercial Transactions

1. Hydrogen market participation regarding production, hydrogen transportation, commercial terms, pricing and current events influencing the marketplace
2. Deep knowledge of the commercial value chain for hydrogen from production to end users
3. Physical assets required to produce, store, transport and disperse hydrogen including billing and the customer interface
4. Evaluation of announced hydrogen projects and assets understanding installed costs and output
5. Hydrogen transportation technologies and costs by road or vessels/barges
6. Costs for liquefaction of hydrogen for transport in tank trucks and storage. Liquefying H₂ to -430°F takes the energy equivalent of about 30% of the fuel input, like wind or solar MW's, to fuel the liquefaction process. (Natural gas goes to LNG at -260°F, 10% of feedstock energy)
7. Costs for high pressure compression of hydrogen for composite trailer transportation and storage
8. Use of ammonia as a form of transportation of hydrogen molecules and as a fuel
9. Creation of strategies and business plans for investors entering the hydrogen value chain
10. Evaluation of hydrogen investment opportunities as points of entry for new players
11. Identification and negotiation of teaming and partnering arrangements with market participants
12. Direct leadership of project development planning with negotiation of site ownership agreements
13. Negotiation of complete EPC contracts directly integrated into financing arrangements
14. H₂ production planning from green electricity
15. Traditional SMR hydrogen production from natural gas
16. Renewable and bio natural gas supplies to produce green hydrogen
17. Use of Carbon Capture Sequestration (CCS) for lower carbon hydrogen production with lower costs including past projects and CO₂ transportation

18. Understanding changing policies to drive hydrogen and ammonia usage with new regulations, incentives, tax credits and proactive legislation to drive a market evolution
19. Use of hydrogen for power generation as primary fuel or blending into natural gas equipment
20. Blending of hydrogen into natural gas pipelines for transportation and its limitations
21. See 2021 Hydrogen presentation on YouTube by Brad Williams at utility conference
<https://www.youtube.com/watch?v=1B9346klh9c&t=1208s>
 - a. 1 kg or 2.2 lbs. of H₂ has 100% of the energy of one gallon of gasoline (114,300 Btu)
 - b. 1 MM MT H₂ per year equivalent energy to about 313,000 MMBtu/day natural gas
 - c. While hydrogen has a very high energy content per kg or pound, at just over 50,000 Btu/lb versus about 20,000 Btu/lb for natural gas, it is not as dense. On a volumetric basis, hydrogen contains about 270 Btu per cubic foot (ft³) while natural gas usually comes in at near 1,000 Btu/ft³.
 - d. A city bus with a fuel cell will use about 30 kg/day with a range of about 300 miles

Core Qualifications and Expertise:

1. Global energy infrastructure subject matter expert
2. Creation and preparation of strategies, business plans with effective execution of plans
3. Project feasibility studies to define opportunities with the value drivers and risk mitigation
4. Strategic planning and infrastructure development with permitting, budgets and timelines
5. Transaction leadership: structuring, negotiations, EPC contracts, financing/debt alternatives
6. Hands on execution with your team's input and participation
7. A proven track record of developing asset projects and adding value
8. M&A due diligence team leader including commercial and technology assessments
9. Commercial and technical matters associated with assets and contracts
10. Negotiation of Sale and Purchase Agreements with Special Provisions for specific transactions and being a mentor to team members
11. Small scale energy production, storage, distribution and marketing to displace oil-based fuels for road use, marine bunkering, locomotive fueling and high horsepower users
12. Business planning and economic analysis with a focus on environmental stewardship
13. Strong project management skills, creative deal structuring, team leadership and mentoring
14. Joint Venture creation, organization, management with governance and control rights