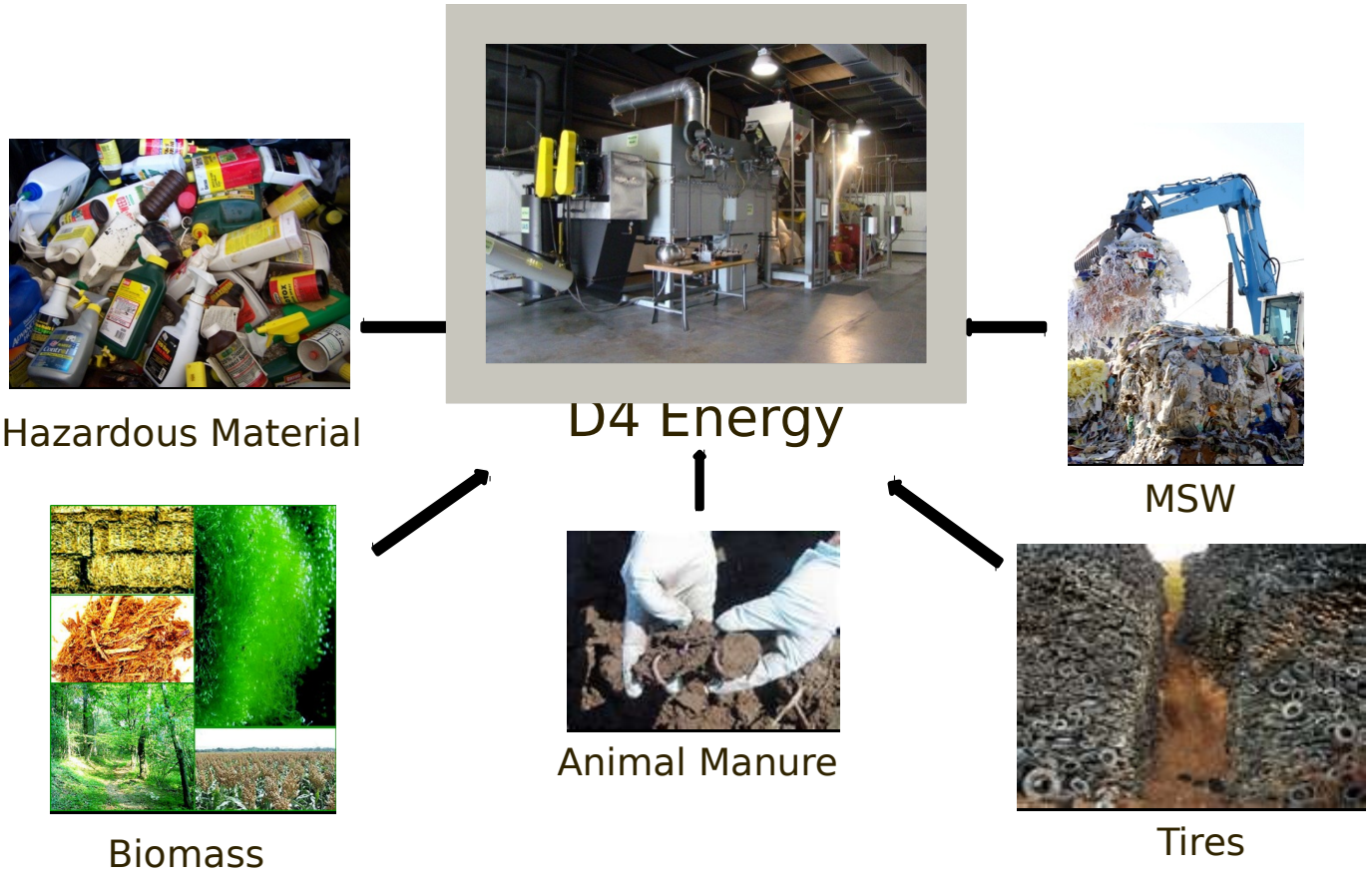
# D4 Energy Group

Clean Energy Solutions | Modular Energy Technology

simplifying Energy Generation

# D4 is a leader in the Waste to Energy (WtE) space




D4 Energy Group Inc. (“D4”) is commercializing proprietary solutions to convert carbon based waste feedstock to energy

# D4 solutions for Public and Private Sector Projects.

D4’s portable, modular 1.25mWh unit converts waste to energy for public and private sector applications. These includes utility, industrial, agricultural and residential applications.

# History of D4 Energy Group

- Technology R&D completed over a 12 year period with an emphasis on tires, MSW and biomass. Two half scale pilot units and one production scale system developed and operated.
- Incorporated in 2009 to commercialize technology.
- Current version tested more than 1,000 hours with multiple types of MSW and biomass feedstocks.
- Independent energy and mass balance demonstrated that a D4 unit will:
  - Convert on average 80% of feedstock to gas and 20% to carbon
  - Produce syngas with a caloric content of from 600 to 750 BTU
  - Resulting in 1.25 mWh of electricity from 30 tons of processed feedstock
- In November 2011, first commercial system shipped to a customer in Wadowice, Poland.

# Waste-to-Energy Industry Overview

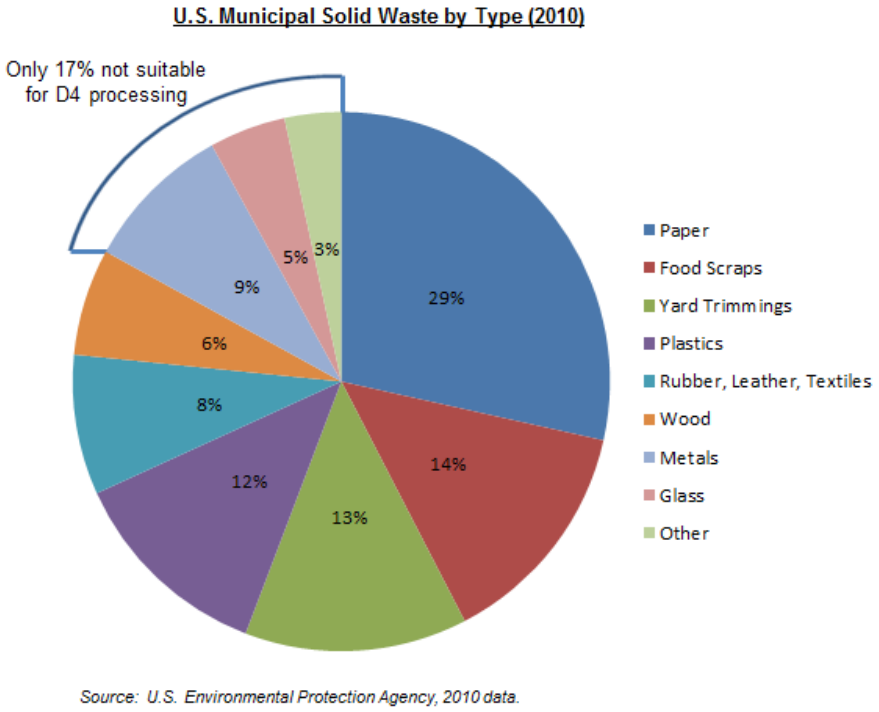
- Increasing waste generation from population growth and urbanization

Limited landfill capacity and a need for environmentally sustainable waste disposal

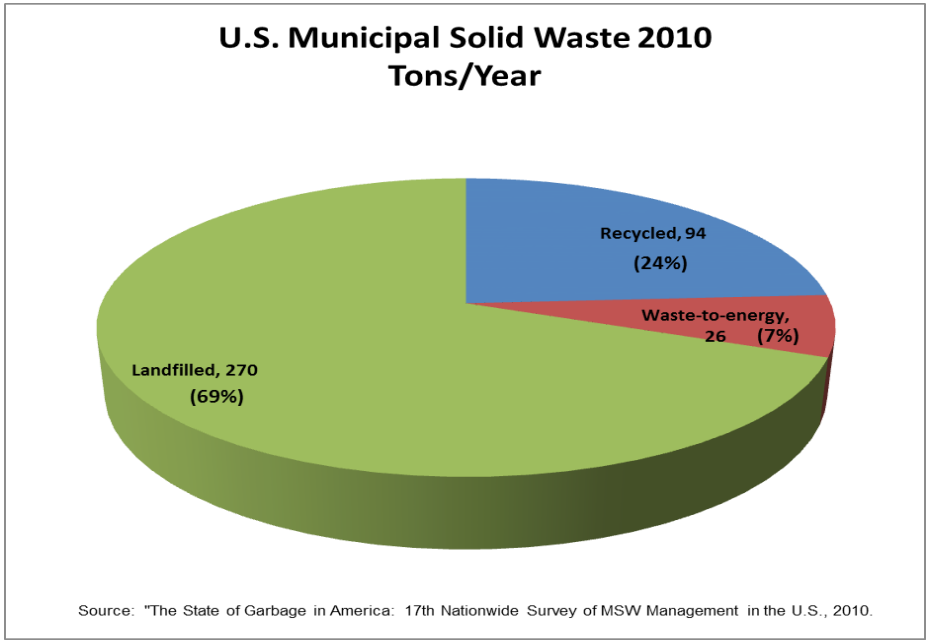
- Fossil fuels are a major contributor to climate change and the supply side grows increasingly risky with mounting instability in the Middle East and Persian Gulf

# Waste-to-Energy Industry Overview (USA)

The USA produces more than 254 Million Tons of MSW each year.




*Source: U.S. Environmental Protection Agency, 2010 data.*



# Key Economics

This is a full production unit capable of producing 1.25 mWh

D4 customer economics:

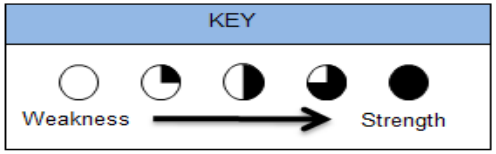
- CAPEX ($4.5 million/MW)
  - IRR – Minimum of 18%
  - ROI – Avg. 50 – 60 Months
  - The IRR/ROI includes NO tax or carbon credits, subsidies, etc.

# A Sustainable Advantage

| Benefit | Description |
|---|---|
| **High waste stream conversion rates** | Approximately 80% of feedstock is converted to syngas and 20% to carbon |
| **Medium BTU values** | D4 units produce on average 600 to 750 BTU gas |
| **Efficient processing** | A small amount of the gas produced (approx. 15%) is used to run the D4 units and make the process self-sustaining |
| **Zero emissions** | D4 units operates as a closed loop system that create no emissions in processing of the feedstock |
| **Modularity and scalability** | Systems start as small as 1.25 MW (30 tons/day) and grow as large as 40 MW (1,000 tons/day) |
| **Low investment threshold** | $5.5 million for a single D4 node vs. hundreds of millions for various other technologies |
| **Lower capital costs** | $550 per annual processed ton vs., for example, $2,000 per processed ton for mass burn incinerators |
| **Lower operating costs** | Driven by modular configuration, simpler design, and operation at a single atmospheric pressure |
| **High return on investment** | Minimum IRR of 20% with an average 50 to 60 month payback period |
| **Flexible feedstocks** | Accepts a wide variety of waste streams and/or biomass |
| **Greenhouse gas reduction** | Reduces landfill methane and reliance upon fossil fuels |
| **Fast installation** | Can be delivered, assembled, and making energy in as fast as four weeks |
| **Portability** | Can be disassembled and moved to other sites |

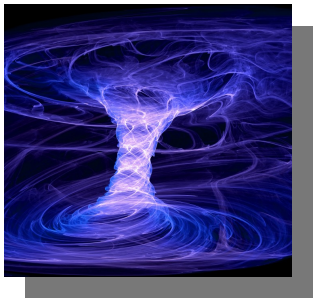
# Strong Competitive Differentiators

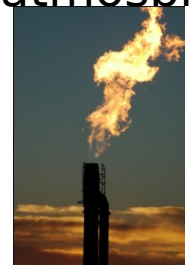
| Technology | D4 Energy | Incineration | Gasification* | Plasma arc gasification | D4 Performance |
|---|---|---|---|---|---|
| Waste conversion | ◕ | ◕ | ◕ | ◕ | Converts 80% of waste stream to syngas |
| Energy production | ◕ | ◑ | ◑ | ◑ | 600 to 750 BTU syngas – does not require additional cleaning processes |
| Emissions | ● | ◕ | ◕ | ◕ | No emissions |
| Feedstock flexibility | ◕ | ◕ | ◕ | ◕ | A wide variety of biomass types and MSW |
| Ability to scale down | ● | ◔ | ● | ● | 30 tons/day with a single node |
| Ability to scale up | ◕ | ● | ◑ | ◑ | Up to 1,000 Tons/day with 35 nodes |
| Portability | ● | ○ | ○ | ○ | Can be disassembled, moved and making power in 24 hours |
| Capital costs | ● | ◔ | ◑ | ◑ | $4,000/MW, $500 per annual ton processed |
| Operating costs | ● | ◑ | ◑ | ◑ | Simpler, modular, and operates at only 1 ATM |



# The Science

**Process:** Proprietary technology built upon the proven sciences of pyrolysis (devolatization in an inert atmosphere) and hydropyrolysis (devolatization in a hydrogen-rich atmosphere).



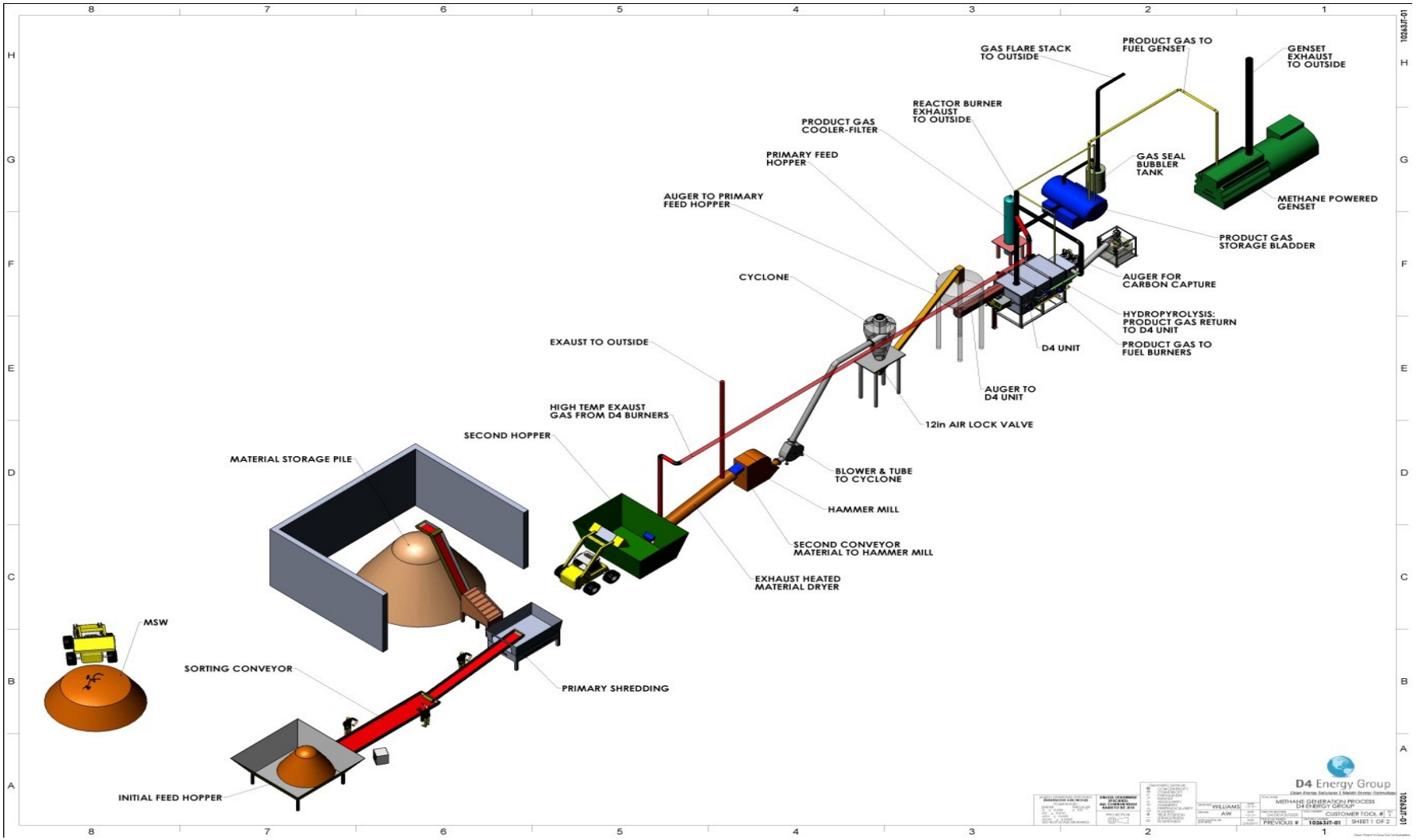


**Output - Gas:** Syngas (600 - 750 Btu). Used for power production or used directly for industrial purposes.

**Output - Carbon:** Can be sold for soil amendments, fuel sources, fillers for rubber, plastic applications, filtration, and road c ction additives.

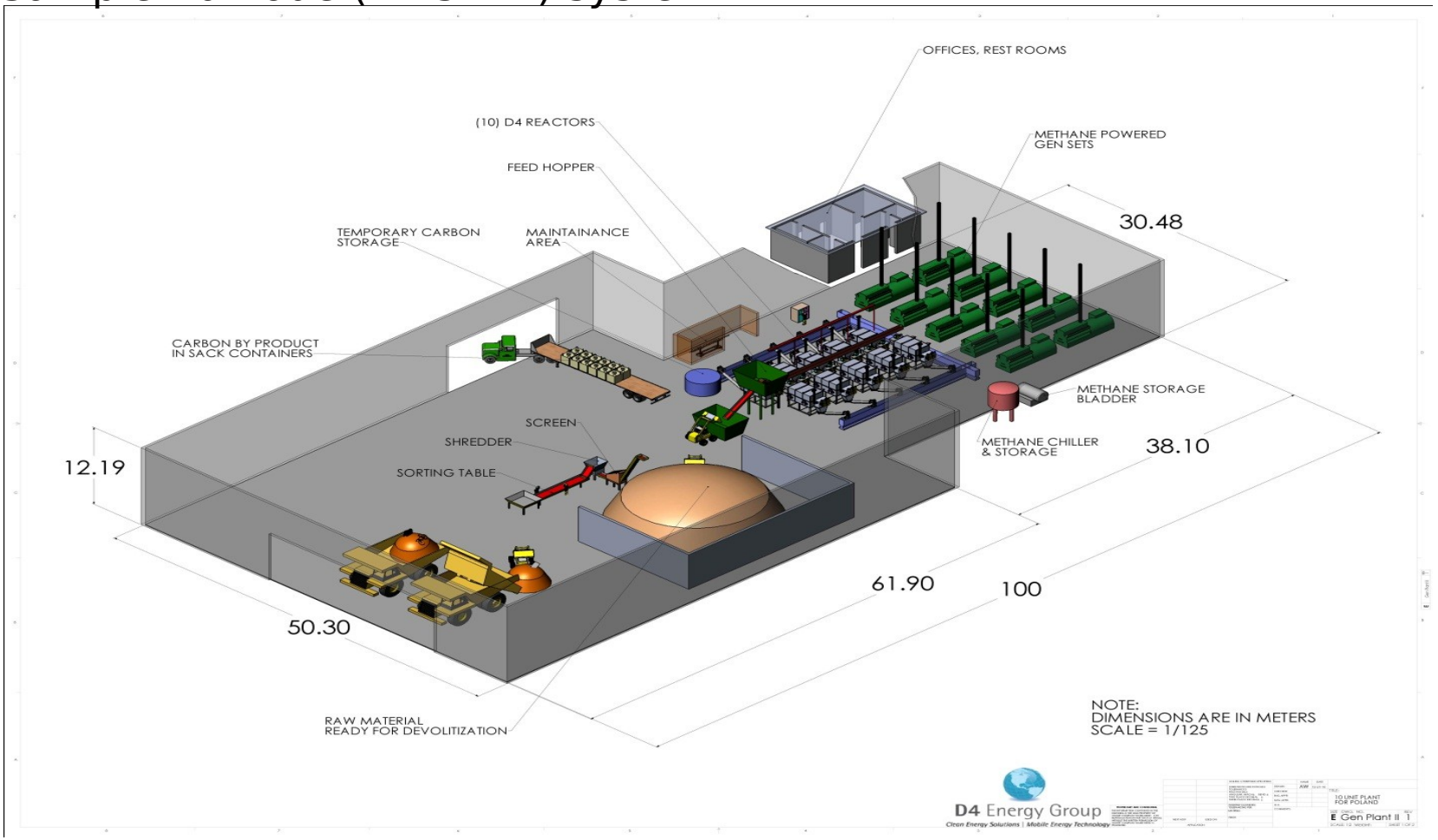
**Emissions –** Equal to natural gas but no emissions in the conversion from waste to gas.

# From Single 1.25MW Systems …



# ... to multiple node systems

- Sample 10 node (12.5MW) system



# Complete range of D4 professional services

- Complete systems integration and installation
- Training on operations, maintenance and safety
- 24/7 Technical Assistance Center
- Warranty support programs
- Spare part programs
- Ongoing education and safety certification

# Future of D4 Proprietary and Innovative Technology

## Liquefaction

D4 Energy will be bringing to market a liquefaction technology capable of taking carbon from our current technology and producing a high quality diesel fuel/JP8. Each unit will produce approximately 4 million gallons per year

## Mobile Unit

D4 energy will be bringing to market a  mobile expeditionary energy system consisting of 3 – 4 theater hardened tractor/trailer units that from time on site to making energy will be 4 hours. This system is being designed for Defense and Emergency Response/Disaster Recovery.

# Management

- *Don Rosacker: Chief Executive Officer.* Mr. Rosacker has a wealth of experience in domestic and international public sector business development and government relations as well as directing startup and growth companies in technology, software, identity management and homeland security areas. Mr. Rosacker is the Managing Partner in D4 Consulting Group, a business development and government affairs strategy firm based in Washington DC and a partner in D4 Investments, a real estate investment firm focused on Eastern Europe.

- *Norb Nicpon: CFO* Norb Nicpon has been a CFO for both public and private companies in a variety of industries ranging from manufacturing to e-commerce. Mr. Nicpon has vast experience in working with companies ranging from start-ups to large multi-million dollar corporations. He has demonstrated hands-on success in building and managing financial functions including strategic planning and analysis, financial systems design and implementation, accounting, budgeting and forecasting, and internal and external reporting.

- *Ron Baker: V.P. of Research & Development.* Mr. Baker has over twenty years of management experience with a strong interest in the development of gasification methodologies. Prior to exploring gasification technologies as a solution, he worked with Michelin Tire Corporation for over fifteen years as a senior management executive responsible for North American field evaluation. After leaving Michelin, Mr. Baker held several Plant Manager positions on a consulting basis which eventually lead him to Bixby as vice president of Gasification & Liquefaction division.

- *Joe Sleiman: Vice President of Business Development.* Joe Sleiman has more than 30 years of experience with civilian, defense and international projects. Mr. Sleiman joined the Defense Solutions Group of SAIC in 2007 where he is responsible for the Capture Management of major procurements of strategic opportunities. Prior to SAIC, Mr. Sleiman worked at Harris Corporation for 30 years, most recently as Vice President and Managing Director of Civil Agencies and International Business Development. Mr. Sleiman holds a U.S. patent for “Weather Information Dissemination”.

# Management

- *Jeff Hogg: Vice President of External Affairs.* Mr. Hogg was a Senior Congressional Staff member who specialized in energy and commerce, armed services, and agriculture issues. Mr. Hogg went on to advise Fortune 500 companies, associations, and political organizations on their strategic planning and communications. Mr. Hogg has helped write legislation and has advise policy makers on regulatory matters relating to defense, commerce, banking and finance, agribusiness, and energy issues.

- *Allen Williams: Vice President of Engineering.* Mr. Williams has over 20 years of experience in managing the design of technologically complex systems. Mr. Williams has specialized in the development and deployment of civil engineering components, networks, nationwide radio and television broadcast systems, communications systems, and the software to monitor, control, and manage these complex networks. Mr. Williams founded a telecommunications company in the mid 1990's to take advantage of the emerging field of voice-as-data. As Chief Technology Officer, Mr. Williams negotiated contracts with major international carriers and deployed networks all over the world. He has since successfully led Iraqi Media Network as Chief System Engineer and has developed the RF and satellite communications systems for the Harris relief effort after Hurricane Katrina.

- *Rick Setzer: Vice President of Logistics/Manufacturing.* Mr. Setzer has over 35 years of managerial and leadership experiences in the areas of manufacturing operations, quality control and quality assurance, human resources, employee development, and safety/health/environmental. Mr. Setzer was a VP with Bottom Line, Inc., a consulting and training organization with clients ranging from large international corporations, i.e. Siemens, and small industrial organizations to federal and state governments and for 26 years with Michelin North America, Inc. and Michelin Research and Development Corp. in a variety of positions in manufacturing operations, quality control and assurance, human resources, managerial and employee development and safety/health/environmental.