

# Engineering and Project Management



***DMA***



## for Sustainable Alternative Energy Infrastructure

- *Vehicle Refueling Stations*
- *Backup / Emergency Electrical Generator Systems*
- *Distributed Electrical Generator Systems*

***DMA, Inc. since 1991***

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## AE SYSTEMS

### Defining Alternative Energy

Alternative Energy or "AE" infrastructure uses non-conventional energy forms to produce electricity and to fuel vehicles. Included in this broad matrix are emergency and uninterruptible power systems, transportation, on-site electricity generation, combined heat/power systems, off-grid power, and electrical peak-shaving systems.

**These Alternative Energy sources are adaptable to transportation or electrical power applications:**

- Hydrogen
- Compressed Natural Gas (CNG)
- Liquefied Natural Gas (LNG)
- Hydrogen/Compressed Natural Gas Blend (HCNG)
- Solar Power
- Wind Power
- Landfill Gas
- Biomass
- Biodiesel
- Geothermal
- Water Power
- Methanol & Ethanol



### Transportation

DMA turnkey fueling solutions for Alternative Fuel and Advanced Technology Vehicle (AFV's) support refueling stations worldwide.

**DMA specializes in transportation applications for:**

- Hydrogen
- Natural Gas
- Hydrogen/Compressed Natural Gas Blend

Alternative fuels are most beneficial when generated off-peak, when energy costs are lowest, and then used during peak demand times, when energy costs increase.

This system is particularly economical for the re-fueling of fixed-route AFV fleet vehicles such as transit fleets, taxis and delivery vehicles.

Alternative energy systems also produce fewer harmful emissions, and can help companies satisfy environmental mandates.

### Power

DMA provides the expertise required to implement an alternative energy electrical generation system using the fuel that best suits your requirements.

Systems may include primary power systems that use renewable resources such as:

- Solar Power
- Wind Power
- Water Power

Fuel produced by the primary power systems, such as pure hydrogen, can be used immediately or stored on-site. On-site storage is a secure, accessible and cost-effective energy management tool. Stored energy can be transformed to usable power in several ways.

### Fuel Cell

Cells use a chemical reaction that produces electricity from a fuel source such as hydrogen. In essence, they "store" electricity without batteries. The electricity may be used at the site, sold back to the "grid" or a combination of the two.

### Internal or External Combustion Engine/Generator Set

Stored fuel powers an internal or external combustion engine that, in turn, powers an electrical generator. Like the fuel cell, the electrical output can be used to power operating systems more cost-effectively during on-peak electrical times, or it can be used in a "grid parallel" mode.

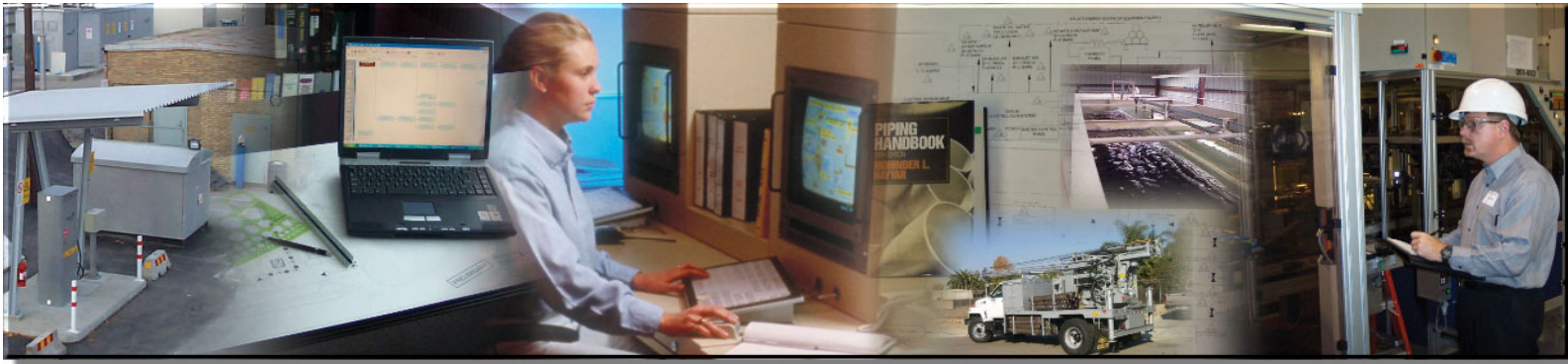
### Internal or External Combustion Engine/Mechanical Shaft Power

Fuel is used to power an internal or external combustion engine that provides shaft power. Shaft power can be used to power machines such as air compressors, pumps and chillers.

### Combined Heat and Power

Waste heat generated by the alternative energy system can be captured and reused for other low grade energy requirements, greatly increasing overall system efficiency.

# Energy . . . Engineering . . . Excellence



## AE SERVICES



### Engineering Services

DMA offers a full spectrum of engineering services to evaluate and select an alternative energy technology, and to design and build your AE plant. These include engineering and project management services in the disciplines of mechanical, electrical and controls, civil and structural, architectural, environmental, geotechnical, code compliance and safety.

### System Integration

DMA provides complete alternative energy systems, including design, equipment and installation specifications and drawings, approvals and risk analysis for your transportation and power requirements.

### Project Management

DMA project managers assist with planning, scheduling, procurement, logistics, construction supervision, commissioning, acceptance testing and as-built documentation.

DMA provides stakeholder liaison services to ensure that your Alternative Energy System is understood by all participants and delivers the expected results.

### Project Economics

DMA evaluates your entire project using life-cycle, cost-based analyses including government funding and tax credit opportunities.

### Funding and Tax Credits

Many Alternative Energy projects are eligible for grants, tax credits or other incentives. DMA will analyze funding alternatives that are available to you to streamline project economics.

### Training

DMA will build a custom training program, including operations manuals, health and safety procedures, maintenance manuals and emergency response plans.

### Operations and Maintenance

DMA will customize Equipment Operating and Maintenance manuals for your alternative energy system.

DMA can help maintain your alternative fuel system through remote monitoring.

*This Includes:*

- Real-time data acquisition
- Systems monitoring and supervisory control
- Advanced problem detection
- Predictive maintenance scheduling
- Customer billing and collection
- Data trending
- System use analysis

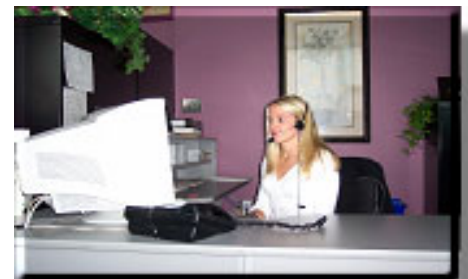
### Database Development

The DMA Information Technology Team develops complete database-driven information systems to maximize the "usability" of your Alternative Energy System data.

Alternative Energy Information Systems can include Customer Information Systems, System/Station Information Systems, Customer Billing System, or a complete Business Information System for your Alternative Energy Business unit.

### Jurisdictional Liaison

We will act as your liaison to municipal, state/provincial, federal and international regulatory agencies to ensure that your Alternative Energy System meets mandated criteria for design, construction and operation, and is fully compliant with applicable codes and standards.





**DMA has specialized in alternative fuels technology for more than a decade.**

### Hydrogen Systems Integration

DMA designed and installed several large hydrogen projects. Many of our past projects are in conjunction with a major Canadian firm that is among the world leaders in hydrogen generation systems. Projects are located in Canada, the United States, Europe and Southeast Asia. DMA is providing system integration, project management and operations and maintenance manuals for these projects.

### NGV Station Design/Installation

DMA designs and installs Natural Gas For Vehicles Stations. For a distributor of natural gas in Canada, DMA aided in the design of the Compressed Natural Gas stations and provided project management for installation and commissioning, as-built documentation and O&M documentation.

### Consulting and Engineering

In addition to our Alternative Energy projects, DMA assignments have included the design and implementation of tank farms for Ford Canada, systems engineering to a manufacturer of pre-heaters for the foundry industry and engineering and assessment services for a company bidding for local natural gas distribution rights in Mexico.

### Project Management

DMA has managed several large Alternative Energy System projects. Computerized systems linked to various tender documents facilitate completion "on time and under budget".

### Research/Case Assessments

DMA has conducted market and technology research on alternative energy issues, as well as demographic research. Business case assessments are based on "true knowledge" to allow the best possible decision-making.

### Environment

DMA has conducted Phase I, Phase II and Phase III environmental assessments and remediation. We have designed and executed testing for specific environmental contaminants. The majority of our environmental work, however, is focused on quantifying the performance of alternative energy systems.

DMA has also completed analyses to ensure that a proposed Alternative Energy site is uncontaminated and that new Alternative Energy Systems are environmentally compliant.

### System Safety Audits

System safety audits determine whether a system is meeting its objectives while providing a safe environment for stake holders. Besides HAZOP and FMEA studies for our Alternative Energy clients, DMA has completed audits for major corporations, including large integrated electric and natural gas utilities, private electrical power producers, a multinational mining and smelting operation and Atomic Energy Canada.

### Business Systems

DMA operated an automated billing system that was linked to various NGV stations across Southwestern Ontario. The system tracked and recorded purchases made by clients at attended and non-attended dispensing locations. Many of these used card-lock activation technology.

### SCADA

DMA has extensive experience with SCADA (Supervisory Control & Data Acquisition) systems, which can be an invaluable source of data management.

### Government Funding/Tax Credits

DMA has matched government funding and tax credits with AE projects. DMA has assisted several large greenhouse operations in Ontario evaluate equipment, operations and agricultural improvements and developed tax credit submissions that allowed growers to recover significant federal funding.

### DMA Has Provided Alternative Energy Solutions for:

- NextEnergy Center
- Westport Innovations
- Dynetek Industries
- Fuel Maker Corp
- DTE Energy Technologies
- Enbridge Consumers Gas
- Atomic Energy Canada
- FTI International
- Ford Motor Company
- Burlington Transit
- Union Gas Limited
- Daimler Chrysler
- Stuart Energy Systems
- Hamilton Street Railway Corp.
- Trillium Energy Canada
- West Coast Energy International



# DMA

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