# WHO?

**The Aetodyne senior management team** is made up of highly experienced professionals with experience and expertise in technology, hyper-growth, M&A, energy, legal, financial, agriculture, startup and several Fortune 500 companies.

**John Bickel, President/CEO**. West Point Grad, Special Forces, LTC (ret), Corning VP Operations, lab to $300 mil in four years, startups.

**Gary Amos**, General Counsel. 25 years attorney (high tech), 13 years law professor. General Counsel seven years.

**Rolf Glerum**. Co-founder of Bruneau Power Group on project with Argonne National Labs. Worked in wind farm industry and developed dairy industry defluorination process.

**Peder Hansen**. Long history in wind energy - Vestas, GE Northstar, sales, marketing, Danish Special Ops.

**David Leis**. West Point grad, Ranger, Company Commander, high tech, startup, Fortune 500 senior exec (Corning, RCA, GE).

**Kevin Purcell**, CFO. MBA, CPA, CMA, 30 years experience including KPMG, Corning division CFO and CFO of two public companies.

# WHAT?

**What is driving the Aetodyne idea?**

From both the production and use standpoints, **anhydrous ammonia** has strategic implications for fuels (both mixed and hydrogen), agriculture (particularly United States agriculture) and the environment (massive production of $CO_2$). In terms of fuels, there are major initiatives underway in the U.S. to lessen its dependence on imported oil with the oft-cited goal of energy independence. In the search for alternative fuels, the late Matt Simmons, founder of the world‟s largest energy investment banking firm, *Simmons and Company*, has identified and advocates that only one potential fuel fills the need in the foreseeable future – anhydrous ammonia. ***“NH3 (Liquid Ammonia) is [the] only realistic solution that makes sense.”*** (*stated in the keynote address, Ammonia Fuel Conference, Kansas City, October 2009*). While that might appear to be a viable solution near term as it can be burned mixed with other fuels in an internal combustion engine (ICE), it only exacerbates the problem since 75% of U.S. consumption is currently imported (for fertilizer) from different countries, including Russia and China. In addition, while ethanol for fuel is being touted as a viable alternative for use as a fuel, missing from the radar screen of the media is that nearly 100% of the ethanol for fuel produced in the US from corn is dependent on NH3. **The second strategic imperative** is derived from the fact, as noted above, that we import 70-75% of the anhydrous ammonia for fertilizer: *we are dependent on foreign suppliers for a very large part of our food supply*. Not readily recognized is that, according to some sources, 50% of the protein consumed in the US is directly dependent on the use of $NH_3$.

The potential strategic threat from importing such high percentages of our fuel and fertilizer is real. What is urgently needed is a ***clean, reliable, distributed, locally produced and cost effective solution*** to both. While as a nation the US could build more of the 100-year old technology Haber-Bosch (H-B) plants, there are several factors that preclude this from happening:

- **These plants are capital intensive**
- **Their production is tied to the use and price of natural gas**
- **The process generates massive amounts of GHG's, including $CO_2$.**

The U.S. EPA has just ruled that $CO_2$ is a toxic substance subject to its soon to be released regulations. Taking these factors into account, it is highly unlikely that any new H-B $NH_3$ plants will be built in the U.S.

**Aetodyne** has a technology and market solution that better addresses these very real strategic imperatives. The current 100-year old production technology is tied to the price of natural gas (uses 3-4% of the world's natural gas to manufacture), is a major polluter (2 tons $CO_2$ per ton $NH_3$ produced), is affected by the weakness of the US dollar (75% is imported) and can potentially be threatened by disruptions in the supply chain. Smaller, distributed ammonia plants (μ-hubs) of all types can be powered by renewable resources such as hydroelectric, wind, or solar, and when produced in this manner, ammonia is classified as an advanced bio-energy fuel by the USDA.

While the use of $NH_3$ in agriculture alone argues for an exceptional opportunity for Aetodyne‟s products, it is the use of $NH_3$ as a fuel that demands a technology breakthrough that is both ***distributed*** (close to point of use to reduce transportation costs and supply chain disruptions) and ***green*** (to eliminate GHG's including $CO_2$). The Aetodyne solution achieves all of that.

While not a panacea, the Aetodyne technology is positioned to play a significant role in the future of alternative energy. It is pragmatic, here today and part of the puzzle that constitutes a significant part of the solution that directly addresses all of the previously mentioned strategic imperatives.


**When will the Aetodyne product be available for widespread commercial use?**

Aetodyne is focused on the commercialization of an invention that will substantially improve the production of anhydrous ammonia ($NH_3$). $NH_3$ is a chemical that is widely used ($10B US market) in a number of different applications, including fertilizer, composite fuels, and hydrogen. The Aetodyne process technology uses air, water, and electricity to produce $NH_3$, a product which is in extremely high demand worldwide and currently tied to the price of natural gas which has climbed dramatically over the last decade. This totally "green" process can produce $NH_3$ for 50-70% of the average price that $NH_3$ has been selling for over the last 2 years.

Aetodyne will initially manufacture and sell μ-hubs (micro-hubs) on a turn-key basis to end-users for localized production and consumption of $NH_3$. Aetodyne is negotiating a licensing arrangement that will make worldwide exclusivity for the manufacturing, distribution, and sale of systems (containing a key process technology) a reality. Significant research (> $20mil) has resulted in patents which have been granted for the ceramic materials used in the equipment for anhydrous ammonia production using electricity, air (nitrogen) and water to produce anhydrous ammonia ($NH_3$). **The process produces oxygen as a by-product and is completely free of greenhouse gases.**

Aetodyne will first build a bench-top display unit to produce 1 kg/day of $NH_3$. This unit will support further optimization of the process and provide critical data for the scaling of the process. This unit will also be used as a commercial/sales tool to demonstrate the validity of the product to potential customers. Once completed (~ 3 months), work will begin to design and build a 1-ton/day pilot facility μ-hub to create a demonstration facility to support sales and marketing efforts and for touring potential customers. Within the first year of full operation, the company will also begin development of a 10-ton/day μ-hub unit which will serve as the first commercially available unit. Later scaling is expected to design up to a 1,000 ton/day unit to support the anticipated market requirements.

*The key objectives during the first year of operation are:*

- **Testing and optimization**
- **Develop prototype**
- **Launch commercialization**


**Where can Aetodyne products be found?**
The United States Agricultural Marketplace and specifically, wherever fertilizer for agriculture is currently in use. Why? Consider the following:

- The market currently exists and is over $10 billion in size in the U.S.
- It is fed by over 70% imports
- $NH_3$ is currently produced from natural gas and thus subject to natural gas price fluctuations and pressures for greenhouse gas reduction
- A critical raw material to the agriculture community and to our food chain
- Supported by an existing infrastructure for distribution and storage
- Handled without safety issues across the agricultural states and via interstate transportation

While Aetodyne develops its brand awareness in the Agriculture / fertilizer markets, it will pursue other important opportunities in fuels using the same technology. Formulas and procedures for the production of composite fuels (e.g., $NH_3$ and diesel) will be developed. A ready market for composite fuels is agriculture. Initial sales into that area will be leveraged by having already sold Aetodyne μ-hubs to the same customer base

for fertilizer applications. In order to meet the larger volumes demanded by fuels, the company will scale up the production units in parallel with developing engine modifications and procedures.

The University of Iowa, the Merchant Marine Academy, and other institutions are doing significant research and development into the usage of $NH_3$ as a composite fuel in diesel engines for trucks and other large industrial equipment. As those technologies become commercially viable, Aetodyne intends to be the lead $NH_3$ source to support significant diesel fuel consumers (such as state and local governments, transportation companies, distribution centers, construction companies, etc.) with localized production facilities.

Finally, $NH_3$ is an excellent energy storage medium to support the infant hydrogen market. Its energy density is twice as efficient as cracking $H_2O$ to produce hydrogen for cars, etc. Aetodyne is very interested in developing a longer term market opportunity as there is much work to be done in building the needed infrastructure to support hydrogen. In the role of a supplier to the hydrogen market, the company will participate, where appropriate, in influencing the use of $NH_3$ as the medium of choice creating a huge demand for Aetodyne technology.


**Not enough detail?**
Need to fill in more blanks? Well, stop reading this story and call us at once! There is nothing like a live conversation to educate and enlighten. And, Dave *loves* to talk...

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