Anaerobic Digestion & Biogas: Industry perspectives
Anaerobic Digestion 101

Anaerobic Digestion (AD) can produce energy, fertilizer and renewable natural gas (biogas) from a number of inputs: waste water; agricultural waste and manure; and municipal/commercial food waste. Each of these areas has seen steady and substantial growth over the past ten years. The Biogas data project states that over 1,200 Waste Water Treatment Plants (WWTP) in the US produce Biogas from solids and over 1,000 now use this biogas for energy.

AgSTAR, an Environmental Protection Agency (EPA) outreach programme, shows that Anaerobic Digesters projects are growing across American farms. The Landfill Methane Outreach programme (LMOP), another EPA initiative, currently lists 782 operational projects, with 316 of these starting between 2008 and 2012. So the overall trend for AD & Biogas is up.

Commercial feasibility

The commercial feasibility of anaerobic digestion facilities varies state by state and depends on a number of additional factors including location, specific technology and the local energy market. There are opportunities for new facilities in most states, as illustrated by the wide demographical spread of existing facilities (figure 2). Furthermore these existing facilities can provide opportunities themselves, both in terms of more efficient production brought by improvements in technology, and more effective production by utilising existing technology better and reducing wasted outputs such as flared gas.

Regulatory challenges

Uncertainty in regulation is one of the major challenges of the AD industry in the US; therefore keeping abreast of regulatory change is vital for those interested in the Natural Gas industry.
The EPA’s recent lowering of Renewable Fuel Standard targets for 2014 is a blow to the existing and future biogas projects and the overall impact remains to be seen. However, some states have made Organics recycling mandatory, with laws in Vermont, Connecticut and Massachusetts. Whilst Organics recycling is driven by a desire to reduce organic material in landfill, this has opened up the potential for more anaerobic digestion facilities.

The future’s bright

Despite recent growth there is substantial scope for growth in all areas of renewable natural gas production. The Biogas data project indicates that nearly two thirds of the 3,200 major Waste Water Treatment Plants do not send solids for anaerobic digestion and that of 12,000 smaller facilities, very few have anaerobic digesters. AgSTAR estimates that anaerobic digestion is feasible at over 8,000 farms across the USA. As of July 2013 LMOP believes that there are 450 potential candidate landfills for landfill gas projects. The financial returns are still attractive and viable in many states. Furthermore, the lure of turning nothing into something, the useless in to the useful, waste into energy, cannot fail to attract.

What the industry leaders say....

The Anaerobic Digestion & Biogas market has enormous potential, with the growth of sustainable waste policies in various states, the desire of commercial companies and agricultural operations to be more self-sufficient and the growing demand for renewable natural gas. Certain states are providing significant incentives and approved projects are showing the way. But the industry is far from being either booming or mature despite the positive signs. So Renewable Waste Intelligence asked some key industry leaders what they thought about the current state of the market:

Harrison Clay, President, Clean Energy Renewable Fuels

Harrison heads up Clean Energy renewable fuels; a division of Clean Energy. Clean Energy Renewable Fuels (CERF), have developed and are currently operating processing facilities at two U.S. landfills. These facilities produce ‘Redeem’, a commercial biomethane fuel that’s far cleaner than diesel with regards to greenhouse gas emissions. Redeem is produced at facilities in Dallas, Texas, and Canton, Michigan and delivered into the nation’s gas pipeline network, displacing conventional natural gas.

Robert Joblin, Cenergy

Bob has been involved in development, management and finance for energy-conservation and economic-development projects in the U.S. and internationally for more than 30 years through non-profit organizations, governmental agencies and private investment. Cenergy has developed ways to turn waste to energy and other reusable resources while improving the environment and creating a profit. It’s business model has been proven successful over the past five years.
Julia Levin, Executive Director, Bioenergy Association of California

Julia Heads up the Bioenergy Association of California. The Bioenergy Association of California (BAC) is a new and quickly growing association established to promote sustainable bioenergy production. Bioenergy includes electricity, biogas, renewable liquid fuels, thermal energy and combined heat and power generated from organic waste. BAC is focused on promoting community-scale bioenergy generation from a wide-range of sustainably available organic waste sources, including dairy and agricultural waste, food and food processing waste, water treatment waste, other organic urban waste, and forest biomass.

These guys will give their views from within the industry on some of the key questions their peers are asking such as predicted growth, regulatory support and the top challenges blocking industry development.

How significant is the Anaerobic Digestion industry’s growth in North America. How do you envisage this playing out over the next two years?

Harrison Clay:
The opportunity for AD in North America is tremendous. It is increasingly clear that AD is the most environmentally sound way of managing organic waste streams. Community and state level environmental policies continue to push AD as the solution for organic waste management. We are big believers that AD will continue to grow over the next two years – particularly in States like Massachusetts and California that have strong organic waste diversion plans in place. We also believe that, due to the growth of the CNG and LNG fuel markets, AD projects that produce pipeline quality renewable natural gas that can be sold as CNG or LNG will multiply exponentially in the coming years.

Robert Joblin:
It will vary by region. For the next two years, most of the growth will be in California, New York and New England. Falling energy prices and lack of incentives are hampering development.

Julia Levin:
California is where a lot of the growth is happening. We have the most organic waste and we have the renewable fuel standard. If you take last year, California only had 6 operating Anaerobic Digestion facilities (outside the waste water treatment sector), but just in the last year, we’ve doubled that. And I would expect we’ll double it again. So for the next few years to come, we can expect to see explosive growth across California.

Which companies are making a big splash in AD at the moment?

Harrison Clay:
Here in California it seems like almost every company with significant involvement in the production or management of large organic waste streams is building or researching AD as a solution. There is still a tremendous opportunity for improvement in the performance and reliability of AD systems and we expect that superior technologies and...
market leaders will emerge over the next few years. But I hesitate to try picking one now.

Are the state and federal governments giving AD & Biogas any support or incentives?

Harrison Clay:
The California low-carbon fuel standard provides meaningful economic opportunity for AD projects that produce pipeline or vehicle fuel quality biomethane for sale as CNG or LNG in California. We would like to see the California LCFS adopted in other states. We are hopeful that Federal Tax reform will lead to long-term, reliable incentives for AD and other biomethane production projects. California also routinely issues grants for biomethane vehicle fuel projects, which can contribute meaningful funds to the capital costs of launching these projects.

Robert Joblin:
California’s new biogas tariff will help, along with New York’s $21 million fund to support Anaerobic Digestion development and the push in New England to move food waste from landfills to digesters. What’s left of federal support is minimal.

Julia Levin:
Yeah, there’s a lot out there. There are lots of different agencies. The California energy commission has two different funding sources available, one for electricity (which is known as the electricity programme investment charge) which has just been authorized for the next 10 years, with about $155 million per year and bioenergy’s going to get a big chunk of it; about half the money available has been allocated to Bioenergy. On the transportation side, the energy commission has a grant programme for clean fuels and vehicles which are worth around $100 million which also has be re-authorized. Only a fraction goes to bio methane currently but over the next year or so, this will increase substantially. The governor has proposed putting a part of the state’s cap and trade revenues (around $100 million) into 3 different pots which would in part fund bioenergy. Dept. of Agriculture would get $20 million for dairy digesters and other carbon reduction projects. The solid waste agency would get £30 million for AD and composting and the department forest and fire would get $50 million for biomass projects. These are not 100% earmarked for bioenergy but large portions should be going to Bioenergy. They have to be approved by the legislature by the end of June.

Is the Bio-CNG market a promising opportunity for AD developers in the USA?

Harrison Clay:
Absolutely. Biomethane vehicle fuel – whether from AD or landfill sources, is the only alternative fuel in the marketplace that can be used to meet 100% of the fuelling requirements of an 18-wheeler, generate a 90% reduction in GHG emissions and be sold, cost-effectively, well below the price of gasoline and diesel. This represents a tremendous economic and environmental opportunity for renewable natural gas vehicle fuel. At Clean Energy, we launched our Redeem biomethane vehicle fuel brand in 2013 and sold 14 million gasoline equivalents across the State of California. We hope to grow those volumes considerably in
the coming years, and tap into the flourishing AD market to obtain the biomethane we need to produce, market and sell Redeem CNG and LNG.

Robert Joblin: Unless a company is vertically integrated (from digester to fleet), the opportunities will be limited until natural gas gets back above $8.

Julia Levin: That market (the Bio CNG market) is only going to grow and the state really wants it to. The carbon fuel standard credit is very valuable. Renewable natural gas can actually be sold competitively with fossil fuel natural gas because of the added value of that fuel standard. So I think the market is going to grow and grow quickly because the air resources board are really interested in the fuels from renewable natural gas.

Overall, what is the biggest challenge obstructing the growth of AD in the USA?

Harrison Clay: The biggest obstacle is obtaining the necessary financing and capital given that the market for the commodities that AD facilities produce is volatile and uncertain. In particular, RINS (under the Federal RFS) and LCFS credits (under California’s low-carbon fuel standard) have limited trading history and are subject to considerable long-term regulatory risk. Structuring off-take agreements that can satisfy capital providers and generate the necessary return on invested capital is the biggest challenge for the growth of AD in the USA.

Robert Joblin: Creating additional revenues to offset falling energy prices and cuts in government support to provide adequate returns. Potentially, this could come from a variety of post-digester opportunities I see developing.

Julia Levin: I think there are two big challenges; cost and the utilities. With these incentives I mentioned we’re starting to address the cost issue. The big California utilities are fighting this every step of the way, certainly on the electricity side but also on the pipeline biogas side. Sacramento have a publically owned utility, without shareholders and investors and have been very supportive of bioenergy. How come SMUD can make these things work where the privately owned utilities can’t?

These industry leaders are all speaking at the 3rd Annual Anaerobic Digestion & Biogas Conference which will be taking place in San Francisco, May 28-29.
3rd Annual Anaerobic Digestion & Biogas Conference

Finance, Build and Maximize your Anaerobic Digestion & Biogas Project

The event will feature:

- **Finance**: Explore and evaluate all the options for financing a successful AD facility to get your project moving fast
- **Construction**: Hear from the top AD developers working in the USA and find out how you can deliver an AD facility on budget and on time
- **Business Model**: Build effective partnerships across the supply chain to secure the feedstock and off-take agreements that will make your project a financial success
- **Regulation & State Support**: Find out what support is available to new AD projects by fully understanding the regulatory landscape
- **Customer Perspectives**: Talk to the municipalities, dairies, food & beverage companies and waste water companies that want to drive AD forward; find out what they want so you can deliver a project that meets their expectations

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