



*Legco Panel on Environmental Affairs
13th April 2013*

Dear Panel on Environmental Affairs members,

Is it time Hong Kong started to listen about plasma gasification of waste and molecular conversion of waste to airline and marine biofuels from Solena (and other suppliers) instead of pushing old polluting technology and its toxic emissions and residues ?

One third of what is thermally converted by mass-burn incineration needs to be landfilled ad infinitum (on expensive man-made islands in the sea) whereas plasma gasification's Plasmarok can be used as inert road aggregate, (that Hong Kong now has to import from China with associated pollution) for its infrastructure projects. Plasma gasification modular plants can be used to reverse-mine our landfills as in Belgium (APP/Machiels venture). That's even before we get into the pollution emissions from mass-burn and the fact that recent peer reviewed studies already found increased child deaths and cancers downwind of modern incinerators.

ENB's blinkered ostrich 'incinerator salesman' has stated that plasma gasification is not on a commercial platform yet (*so it must be true?*) but Air Products and other plasma gasification suppliers, the UK Government, ten major world airlines and the world's biggest shipper, Maersk beg to differ. Whom should we believe? British Airways /Solena plasma plant in London is already under construction and they have asked Solena to build a second plant in Spain.

http://www.kallman.com/shows/alt_aviation_fuels_berlin_2012/presentations/Solena%20Fuels%20Presentation.pdf

and even HKG Government's bonfire consultants AECOM support plasma gasification :

<http://energy.cleartheair.org.hk/?s=zebell>

<http://energy.cleartheair.org.hk/?p=1226>

AECOM will design-procure – construct -operate a gasification plant in the UK.

<http://www.gazettelive.co.uk/business/business-news/2012/11/21/75m-waste-to-energy-plant-plan-for-billingham-84229-32276544/>

Meanwhile in the real world beyond HKG ENB's toxic old technology dream world:

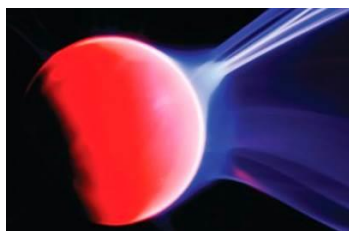
<http://www.waste-management-world.com/articles/2013/04/plasma-gasification-waste-to-energy-air-products-teesside-uk-government.html>

Second Plasma Gasification Plant for Teesside Following Government Deal

12 April 2013

By Ben Messenger

Managing Editor of Waste Management World magazine



Air Products is to build a second 350,000 tonne per year waste to energy plasma gasification facility on Teesside following the signing of a 20 year power purchase agreement with the UK government's Cabinet Office.



According to the government the deal is worth 2% of government's energy spend and is expected to deliver £84 million in savings over the life of the contract through a fixed agreement that will provide stability in what the public sector pays for energy.

As part of the deal, the government said that Air Products expects to invest an amount similar to that of its first plant, around £300 million, to build a second waste to energy facility in Tees Valley, Teesside to supply the agreed 37 MW.

The government said that the agreement means that through its Government Procurement Service (GPS) it will buy a portion of its energy directly from a UK-based generator at a low fixed price, rather than buying entirely through short-term wholesale markets which are subject to unpredictable price fluctuations.

New model for government procurement

"This is the beginning of a pioneering approach to how government uses its collective buying power and long term demand to buy energy," said the Minister for the Cabinet Office, Francis Maude.

"Not only have we secured £84 million of savings for taxpayers by signing a new, low cost energy deal with Air Products, but we're also helping the UK compete in the global race by investing in growth and creating hundreds of new jobs through the construction of a new 'energy from waste' plant," he added.

Lisa Jordan, Air Products' business manager for Bio-Energy Europe, commented: "By buying the electricity we produce, the Cabinet Office will help Air Products divert up to 350,000 tonnes of non-recyclable waste from landfill every year, which we will turn into reliable, controllable, renewable energy."

According to the Cabinet Office said that the new approach will lead to more engagement with the energy industry to assess opportunities for further energy procurements over the next five years. The government claimed that this could mean a significant increase in generating capacity in the UK and help drive down bills for everyone through increased competition.

[Linked In Poll – Is Waste Gasification Coming of Age?](#)

Join the discussion on Linked In and have your say on the subject.

[Is Waste Gasification Finally Coming of Age?](#)

Spurred by government incentives and a stable regulatory environment, Air Products has begun construction of a 50 MW plasma gasification facility in Teesside. With the company already planning a second such plant at the site - as well as others around the country - is the waste industry entering the age of gasification?

[13.6 MW Plasma Gasification Waste Project to Demo Fuel Cells](#)

London, UK based Waste2Tricity, which specialises in advancing the use of plasma gasification technology to treat waste, as well as the integration of fuel cells to generate electricity is to start a Concept Design Study for the development of an advanced waste to energy plant.

[£2.8m Competition to Design Waste Gasification Pilot Plant in UK](#)

<http://www.waste-management-world.com/articles/2013/04/waste-to-biofuel-and-chemicals-project-funded-in-hawaii.html>

WASTE TO BIOFUEL AND CHEMICALS PROJECT FUNDED IN HAWAII

8 April 2013



A zero waste biofuel and high protein feed program in Hilo, Hawaii has been awarded \$200,000 by the state Department of Agriculture at a special open house event at the USDA Pacific Basin Agricultural Research Center (PBARC).

According to the state the PBARC, together with BioTork Hawaii have invested over \$1 million developing an economically sustainable zero waste conversion project, which produces biofuel and high protein animal feed from unmarketable papaya.

BioTork is a Florida based company focused on the development of microbial strains capable of producing bio-based chemical commodities such as lipids, alcohol fuels, enzymes, polymers and other valuable compounds from affordable and renewable organic feedstock.

The conversion process is claimed to take 14 days to cycle in a heterotrophic environment, meaning no sunlight is needed using organically optimised algae/fungi developed and patented by BioTork.

According to Governor Neil Abercrombie the state's \$200,000 investment will assist PBARC in moving the project to pilot scale as a prelude to commercial production.

The State of Hawaii's **Agribusiness Development Corporation** (ADC) will become a venture partner to globally export the rapid conversion technology in association with PBARC and BioTork Hawaii.

"With this technology, farmers can turn agricultural waste into an additional revenue stream, and local production of biofuel can lower dependence on Hawaii's import of fossil fuels," commented Abercrombie.

"Aside from the benefit of producing biofuel, this technology has the ability to create another revenue stream for papaya and other tropical agriculture farmers. Local high protein feed production – another by-product of this process



– can greatly benefit cattle, hog, chicken and aquaculture farms through competitive market pricing," continued the Governor.

The state said that it also hopes to develop a long-term revenue generator as a partner exporting this technology and projected that it could create more than 1000 jobs at full scale.

Feedstocks

While papaya was chosen as the initial feedstock, it was claimed that the technology can be applied to any plant material as a carbon source. In Hawaii, other identifiable feedstocks are unmarketable sweet potato, sugar cane, mango, albizia and glycerol.

According to James Nakatani, executive director of the ADC, the development is a major breakthrough that focuses on key components hampering the sustainability efforts of other microorganism based biofuel projects.

"These obstacles include the high cost of feedstock. Approximately 70% of the cost for production is consumed in this area. Using unmarketable plant and other waste materials drastically reduces this cost driver," he explained.

"While past lab projects have not translated into robust performances when scaled-up, BioTork's solution promotes rapid and dynamic evolution of microorganisms that are robust even in 'suboptimal' conditions," continued the executive director.

The project will use the research and development funds will be used for customising feedstock formulations to create a zero waste conversion technological library for Hawaii which it can export and sell to other states and countries.

Read More

Bacteria that Turn Waste to Energy in Microbial Fuel Cells Studied

Microorganisms which consume waste while generating electricity in a microbial fuel cell are being studied by researchers at Arizona State University's Biodesign Institute.

First Waste to Biofuel Demonstration Plant for Abengoa

Abengoa has opened a demonstration facility which will process 25,000 tonnes per year of waste into 1.5 million litres

Yours sincerely,

James Middleton

Chairman

Dear Panel on Environmental Affairs' Members
11th February 2013

Air Products has a design- build- operate agreement for the plant so it costs the UK Government just the lease for the land, Air Products then charges by the tonne to gasify the MSW and sells the resultant syngas generated electricity to the grid and vitrified slag for road construction. Alternatively a Fischer-Tropsch back-end could be added to create biofuels from the syngas. A win-win situation for Air Products, the Government and the local populace – not one single complaint letter was raised against the EIA for the plant.

The British Airways 'Green Skies' project <http://energy.cleartheair.org.hk/?p=1612> using gasification of MSW to create biofuel is underway in London. Ten World airlines have signed up with Solena for like plants.

Again a bilateral win-win situation for the parties involved. Even the HK Government's MBT consultants **AECOM have lauded the gasification technology**

<http://energy.cleartheair.org.hk/?s=zebell>

<http://energy.cleartheair.org.hk/?p=1226>

and will design-procure – construct -operate a gasification plant in the UK.

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Time for Hong Kong Government to realise that technology has advanced since the decision to use MBT was taken at the expense of mandatory recycling measures, bite the bullet and move on with the gasification technology which will also free up the current medical waste incinerator at Stonecutters for alternative development. Legco should not approve the funding of outdated dinosaur technology.

There is already enough clinical evidence of deaths and cancers caused to populations downwind of incinerators with more reports already in the pipeline.

<http://www.sciencedirect.com/science/article/pii/S0160412012002279>

Conclusions “ Our results support the hypothesis of a statistically significant increase in the risk of dying from cancer in towns near incinerators and installations for the recovery or disposal of hazardous waste.”

<http://news.newclear.server279.com/?p=5875>

Report on the health impact of the MIWA-waste incinerator in Sint-Niklaas Belgium

<http://www.greenpeace.org.uk/MultimediaFiles/Live/FullReport/3809.PDF>

In a House of Lords enquiry on 14th April 1999, Environment Minister Michael Meacher said, “Incinerator plants are the source of serious toxic pollutants: dioxins; furans; acid gases; particulates; heavy metals; and they all need to be treated very seriously.

There must be absolute prioritisation given to human health requirements and protection of the environment. I repeat the emissions from incinerator processes are extremely toxic. Some of the emissions are carcinogenic... We must use every reasonable instrument to eliminate them altogether”.

<http://www.macaudailytimes.com.mo/macau/36605-cuhk-to-start-10-year-plan-on-ka-ho-residents%E2%80%99-health.html>



Home | Macau | CUHK to start 10-year plan on Ka Ho residents' health **CUHK to start 10-year plan on Ka Ho residents' health – Macau** 18/06/2012 10:05:00

<http://www.hpa.org.uk/NewsCentre/NationalPressReleases/2012PressReleases/120124Incineratorstudystatement/>

The English Health Protection Agency announced last week that they have approved funding for a Small Area Health Statistics Unit study to **investigate whether there is any potential link between municipal waste incinerators and reproductive health**. This is for a two year study starting in April 2012. Results will be made publicly available once accepted for publication in a peer-reviewed journal.

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Yours sincerely,

James Middleton

Chairman

<http://oilprice.com/Energy/Energy-General/Garbage-in-Power-out.html>

Garbage in - Power out

By [Peter McCusker](#) | Thu, 07 February 2013 23:05 | 0

Work has started on the construction of the world's largest plasma gasification plant with its development signalling the dawning of a new era in the UK's Energy from Waste sector.

The £300m plant on Teesside, North East England, is being built by US industrial gases outfit Air Products using the latest plasma gasification technology developed by AlterNRG Westinghouse.

The 50MW, Combined Heat and Power (CHP) plant will convert domestic and commercial waste into a syngas, which can generate steam for electricity, or for producing chemicals or liquid fuels.

The current technology deployed by the UK's limited number of EfW plants is mass burn incineration which turns the waste into steam to power turbines. Emissions from these plants have led to concerns over the environment and health.

Air Products has subsequently unveiled plans for **a second plasma gasification EfW plant, next to the first one**, and the two plants between them have the potential to recycle the rubbish from over one million households. – powering 50,000 homes.



But, as things stand the UK lags well behind the rest of the Europe in the EfW sector. One reason for this is that it has always sent more waste to landfill than on the Continent.

Around two-thirds of the UK's domestic waste is currently sent to landfill but this is set to change markedly over the coming years.

Waste companies are increasingly anxious keen to divert household and commercial rubbish from landfill with **landfill taxes currently at £72 a tonne and rising to £80 a tonne in 2014, and penalties for failing to hit recycling targets of £150 a tonne.**

In a bid to give the sector a shot in the arm the UK Government announced last October it would **subsidise CHP EfW plants at the same ratio as offshore wind - the highest available - through the ROC (Renewable Obligation Certificate) scheme.**

It was this announcement that prompted Air Products to confirm its intention to build its Teesside plant.

Half the world's food thrown out

Using household waste to generate electricity seems like the perfect alternative energy.

It's an abundant commodity. Recent research shows that as much as half of all the food produced in the world is thrown away.

It also diverts waste from landfill and **the new generation of plants emit around the same levels of carbon dioxide as low-emission solar.**

The added benefits for the plant operators in the UK **are that they are paid to make the power and they're also paid to take the waste.**

But waste is a poor commodity from which to generate power, possessing a relatively low calorific value.

The 100MWs generated by the two Air Products plants is less than one-tenth of the 1,875MWs generated by Teesside Power's nearby gas power station at Wilton - equating to 4% of UK's total power output.

This means an EfW energy plant can be over seven times more expensive to build and operate than a gas-powered station and over three times more expensive than onshore wind.

Consequently, Air Products is cute enough to hedge its bets.

Lisa Jordan, business manager, bio energy, at Air Products said: "The economics of offshore wind are marginal at the existing subsidy level and for ourselves too, the challenge is to fully commercialise what we do and make the economics work for us."

She continued: "Our history of working with oxygen and gases will allow us to deploy our own clean-up technology at the back-end of the gasification process.

"This allows us some flexibility in what we can do with the recycled waste.

"If the market for fuel-class hydrogen develops we can change the back end and increase our production of hydrogen.

"We have the ability to deliver different treatments to the syngas, which can create different end products."

Low carbon emissions

The syngas produced by the Air Products plasma gasification plant is composed mainly of carbon monoxide and hydrogen, with smaller quantities of carbon dioxide and nitrogen.

The carbon dioxide emissions are around 52g/kWh, which is far lower than coal, at around 850g/kWh, and gas, at around 350g/kWh, according to figures from the World Nuclear Association.

Optimists suggest that when the sector matures EfW can contribute up to 8% of the UK's 100GW power needs.

But Ben Messenger, of Waste Management World says: "It's difficult to get planning permission for waste to energy plants. They're not liked by those living nearby."

Ms Jordan explained why Air Products chose Teesside.

"This is a fairly large scale industrial process and we were looking for somewhere with an industrial feel.

"We were looking around the UK for brownfield sites, with the appropriate support infrastructure and access to the grid.

"Teesside is a unique bubble. It has a long chemical heritage and this will look more like a refinery, like a chemical plant. There is also a need for jobs and investment in the area.

"There is nowhere like it in the rest of the UK.":

Ms Jordan added: "The UK is seeking more sustainable ways to manage and dispose of its waste, and is looking to diversify its sources of electricity generation- our technology is able to deliver on both counts,

"It certainly has to be part of the mix as more waste is diverted from landfill."

"Waste is an habitual energy platform. It cannot fill the whole gap, but it is a renewable energy source which can operate as a base load option."

Looking to the future Air Products say it has plans for more plasma gasification plants in the UK.

"The UK now has, as we see it, a very stable regulatory environment to enable us to make those future investments," she added.

Elsewhere in the UK Swindon company Advanced Plasma Power has secured planning permission for a number of plants.

A spokesman for the Department of Energy and Climate Change (DECC) said: "When Air Products' plant is built, at 50MW, it will be the largest gasification plant operating in the UK.

"As one of the leaders in their field they intend to use plasma technology. The plasma technology means that the syngas is clean enough for a range of potential applications, not just power but potentially could be used for making transport fuels, hydrogen or bio-methane in the future.

"This direction of travel is consistent with the aims set out under the UK Bioenergy Strategy. **DECC is highly supportive of gasification projects of this type.**"

By. Peter McCusker

**Peter McCusker is a freelance energy writer, based in the North East.*

Background Information

Energy from waste is expensive

The new generation of EfW energy plant can be seven times more expensive to build and operate than a gas-powered station and three times more expensive than onshore wind.

A recent study by engineering consultancy Arup for the DECC showed capital expenditure (capex) of between £3,561 per kW to £6,446 per kW for some EfW Combined Heat & Power (CHP) plants.

The DECC has estimated a new gas station has a capex of between £719/kW to £864/kW, while onshore wind is £1,174/kW to £1,858/kW.

Operating costs for EfW CHP are also high at £16/MWh to £24/MWh.

This is three to four times as expensive as operating costs for dedicated biomass plants at £4/MWh to £8/MWh.

Ben Hall, a senior renewables analyst at London-based Cornwall Energy, said: "It is also worth noting EfW CHP is an infant technology in the UK and is currently underdeveloped compared to other EU countries, such as Germany, France, Denmark."

Last October the UK Government confirmed that EfW plants would be awarded two Renewable Obligation Certificates for every MW/h of energy they produce.

With a ROC being currently valued at £40.71 the **Air Products plant will receive subsidies of £81.42 for every MW of energy produced.**

By 2017 the ROC rate will fall to 1.8 and after that new energy subsidies will come into place under the Contracts for Difference scheme.

Plasma gasification

The Air Products plant at Billingham will operate by heating non-recyclable waste (domestic and commercial) in a process known as plasma gasification.

A gasification plant heats the waste in the presence of a controlled amount of oxygen, **but without combustion.**

The main product of gasification is syngas, which is composed mainly of carbon monoxide and hydrogen, with smaller quantities of carbon dioxide and nitrogen.

The syngas can generate steam for electricity, or can be for producing chemicals or liquid fuels, such as hydrogen.

The residual waste from the process is a solid, vitrified gassy slag - like black glass - and can be used in the construction industry for building roads.

£75m waste-to-energy plant plan for Billingham

- by Kelley Price, Evening Gazette
- Nov 21 2012



Scott Brothers Group's managing director Frank Cooke on the site where the £75m waste-to-energy plant is set to be built
A MAJOR waste-to-energy plant is being planned for Teesside.

The £75m Billingham Energy gasifier, on the old Haverton Hill ICI Billingham site, will be the largest UK scheme of its kind if it goes ahead.

The 14 megawatt plant, a joint venture between Haverton Hill-based Scott Brothers Group and Devon company O2N (Old 2 New), will create around 150 construction jobs over two years and up to 40 permanent positions.

AECOM - the company that built the Shard in London - will carry out the design, procurement, construction and operation of the project.

The plant, which will take 160,000 tonnes of household, commercial and industrial waste a year and turn it into clean energy, could be up and running by 2015.

Bosses say financing is at a “well advanced stage” - and 20 similar UK plants could also be in the pipeline over the next 10-15 years.



They claim their project, which comes hot on the heels of Air Products' announcement of a second energy-from-waste facility at Billingham, will help cement Teesside's growing status as a major hub for waste-to-energy technology.

Scott Brothers Group managing director Frank Cooke said: "Often with gasification technology in the UK, projects turn out to be long-term and are difficult to get off the ground.

"This is an American design, there are more than 20 similar ones in operation around the world, particularly in Scandinavia and Germany - it's tried and tested technology.

"There are some in the UK, but none of this size at the moment.

"We are in well advanced discussions on finance. We are also talking to both local and national waste suppliers.

"The majority of the electricity generated could be used by local chemical companies."

He added: "The old ICI site employed tens of thousands of people in the 50s and 60s; now we are hoping to create employment there once again.

"This project will not only create jobs but renewable electricity using clean technology.

"We are so confident in the technology that O2N is developing, we've taken a 25% stake in the company

Read More <http://www.gazettelive.co.uk/business/business-news/2012/11/21/75m-waste-to-energy-plant-plan-for-billingham-84229-32276544/#ixzz2KXnkX3E5>