



The Concord Blue Solution

Waste To Clean Energy

Q & A with Jack Woodcock

President Concord Blue Energy USA

7th January, 2010

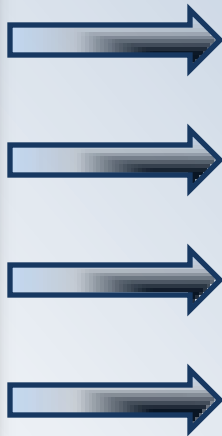


**WHAT IS THE
TECHNOLOGY/PROCESS OF
CONCORD BLUE?**

**HOW DO YOU CREATE GAS FROM
WASTE?**

LAW OF CONSERVATION OF ENERGY

To address that question, let us revisit *The law of conservation of energy* that states *that the total amount of energy in a closed system remains constant*. A consequence of this law is that energy cannot be created nor destroyed. The only thing that can happen with energy in a closed system is that it can change form, for instance chemical energy can become thermal energy.



The crux of our technology is based on the same principle;

Let's find out how...

There is a tremendous amount of energy that is lying to be harnessed within the organic wastes generated in our society.

The CONCORD BLUE REFORMER, converts the waste to a high calorific Gas by liberating the energy from therein. This is done by a process of Thermochemical Degradation – Heating the wastes at a very high temperature in the absence of Oxygen to convert it to gas, which can subsequently be used in a gas engine to generate power from therein;

Here's how it works...

Process Flow



Unsegregated MSW



Trucks carrying Wastes



Waste Storage Unit

Syngas



Gas Engine

Power



Dried & Sorted MSW



Drying and Shredding

Char sent for gasification

Ash for Cement Blocks



IS IT INCINERATION ?

Incineration is disposal method that involves **combustion** of waste material

Combustion definition → A process in which a substance reacts with oxygen and burns to produce heat and light

The **CONCORD BLUE REFORMER** is different from Incineration because we don't burn the wastes. Our process is entirely devoid of Oxygen, wherein the Wastes are thermally decomposed into a syngas.

We convert the waste to gas by heating it at a very high temperature in the absence of air, and hence, we do not combust the waste, as is done in incineration; This also means that we do not pollute as incinerators do.



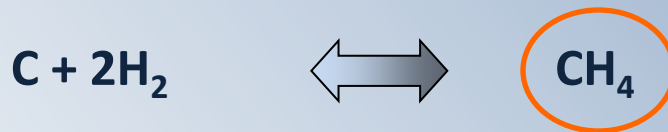
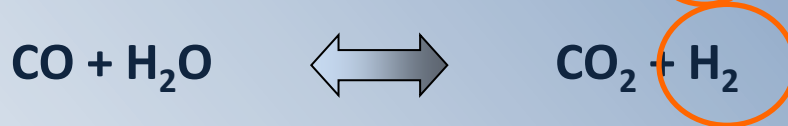
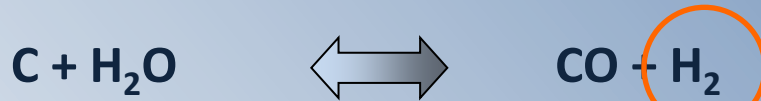
IS IT ENVIRONMENT FRIENDLY ?

Absolutely

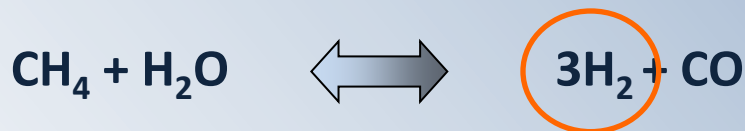
Since the Concord Blue does not burn the waste, we do not produce the pollutants that is normally associated with combustion of such wastes; Our product is a clean gas that adheres (and remains several notches below) to the environmental standards stipulated by the EPA;

CHEMICAL REACTION

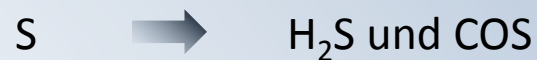
1. Stage One Reforming:



2. Stage 2 Steam Reforming:



The unwanted components of the input material are reformed into non volatiles and are separated from the gas.





**WHAT ARE THE EMISSIONS FROM
THE CONCORD BLUE REFORMER?**

**WHAT HAPPENS WHEN WASTES
LIKE PLASTICS GO INTO YOUR
SYSTEM?**

The Emissions from the CONCORD BLUE REFORMER are minimal, and is very similar to a Natural Gas based Boiler or Heating System; The Chemical properties of the Product Gas from the Concord Blue Reformer is remarkably similar to that of Natural Gas and hence, its emissions also remain as harmless as that of the former;

As for plastics, the same principle of lack of oxidation applies here too; Since, we do not combust the plastic waste, it does not produce the traditional pollutants associated with the burning of plastic like Dioxins, Furans and other carcinogenic substances;



- ❖ **IS THIS A GASIFIER ?**
- ❖ **DOESN'T THE EPA CLASSIFY GASIFIERS AS INCINERATORS ?**

- **The CONCORD BLUE REFORMER is not a Gasifier, it is a STAGED REFORMER - THERMOLYSIS**
- **We REFORM the wastes in the absence of air at very high temperatures (about 1000 ° C) without combusting the same;**

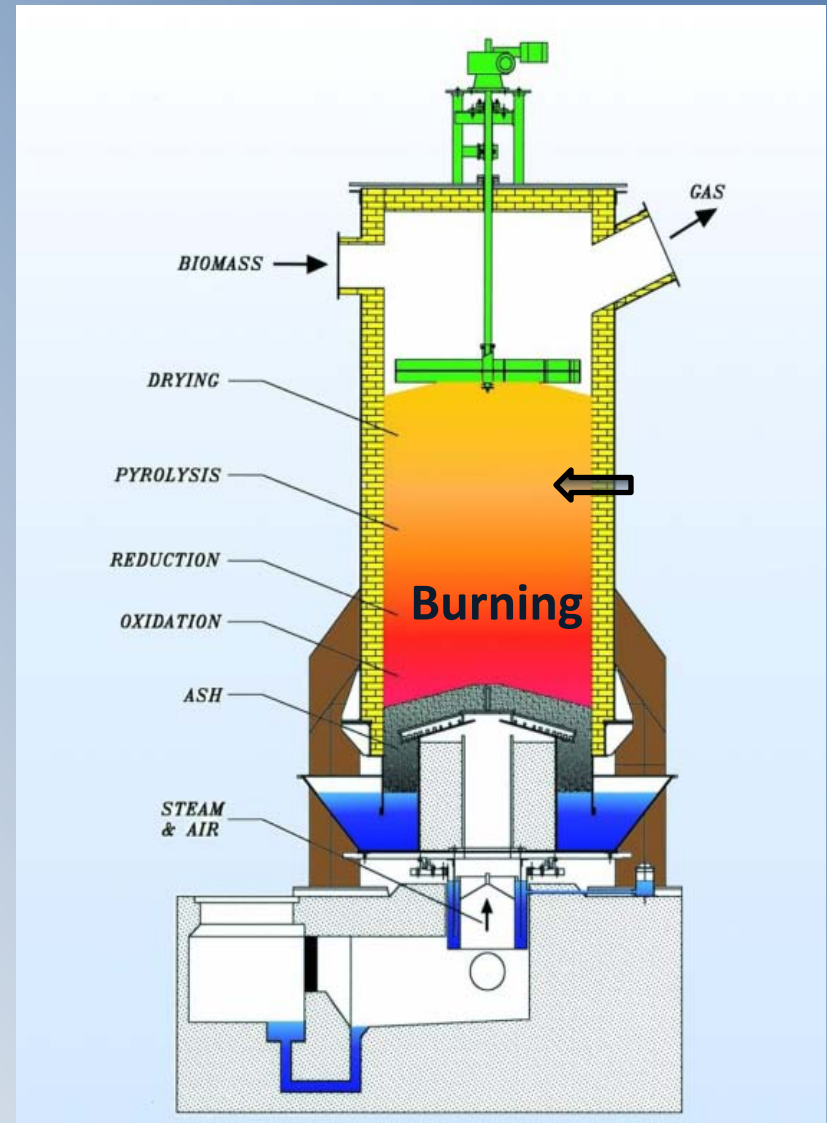
The EPA currently does classify gasifiers as incinerators; However, we are different!

Here's how...

Gasifier

Currently available Gasifiers consist of a PARTIAL OXIDATION (read “burning = incineration”) zone, wherein PART OF WASTE IS ACTUALLY COMBUSTED TO HEATUP THE PROCESS.

Not surprising then, that the EPA classifies these systems as “Just another type of Incinerator”



Since our process does not include any combustion of wastes, we use only the “Clean Gas” to heat up the process, much alike the gas that you burn at your homes;

CONCORD BLUE REFORMER IS THE ONLY TRUE 100% STEAM THERMOLYSIS SYSTEM.



**SO WHAT ARE THE BENEFITS TO
THE ENVIRONMENT BY OUR
SYSTEM?**

SEVERAL

To begin with, we offer an economically viable and sustainable method of waste disposal.

Also, we reduce the carbon footprint, by generating an alternate source of fuel, thereby diminishing the dependence on fossil/imported fuel;

The industries who employ our technology can avail of carbon credits by reducing the emissions around their area of operation;

**The Concord Blue Reformer also generates Biochar
→ a soil nutrient which aids in carbon
sequestration;**



**WHAT ARE THE TYPES OF WASTES
THAT THE CONCORD BLUE
REFORMER CAN HANDLE?**

ANY ORGANIC WASTE

INPUT

Municipal Solid Waste/Bio-garbage/ Restaurant-food waste

Sewage sludge/waste

Animal manure, other animal wastes like carcasses

Any agricultural biomass waste (including plant residuals)

Hazardous Industry Wastes

Plastic Wastes

Bio Medical Wastes



OUTPUT

High quality, high energy value syngas:

Hydrogen: Already proven to be one of the most efficient energy carriers;

Electricity: Turn key system creates electricity via proprietary syngas firing gas-motors

Bio Char: Is currently used in fertilizer and as a soil amendment

Ash, for the Cement Industry



**IN MY COMMUNITY WE HAVE AN ENERGY PLANT
WHICH BURNS WASTE TO MAKE ELECTRICITY,
WOULD THIS BE THE SAME?**

Not at all; They burn waste directly to produce steam, and subsequently power. This is polluting, hazardous and inefficient.

We convert the waste to clean gas by a dual stage reformation (read cleaning) and then use the clean gas as a fuel to make electricity separately; It is certified to be one of the most non-polluting means to generate power.



**WOULD THE EPA PERMIT YOUR PLANT IN
OUR NEIGHBOURHOOD ?**

YES! In fact, the systems, at a de-centralized scale would be classified as a “MINOR” source by EPA standards, indicating the ease of operation and lack of environmental issues; Also, due to the reduced trucking schedule of the waste, the emissions are reduced along with our consumption of fossil fuel.



**WHAT & WHERE DO THE EMISSIONS
RESULT FROM ?**

Plainly put, our process has almost negligible emissions from disposition of wastes.

The normal emissions result from the use of our product gas as a fuel for an engine to generate electricity.



HOW ABOUT THE EMISSIONS FROM THE ENGINE ?

Gas to Electricity has been widely acknowledged to be one of the CLEANEST ELECTRICITY GENERATION PATHWAYS.

This is especially so, when the gas is not a fossil derived fuel, but one that has been derived from Waste or Biomass, such as ours.

The Engine emissions are again a minor source, and exhibits the lowest emissions per KW, meeting the latest EPA standards for any normal gas genset, be it Domestic, Commercial or Industrial.



What are the measures to prevent Chloride Ions from escaping in the atmosphere? Aren't they considered to be hazardous?



Gas from
Concord Blue
System



Alkaline
Scrubbers



Gas, free of
Chloride Ions,
taken to
additional
filtration
chambers and
subsequently the
clean gas is taken
to the Engine

The Concord Blue Reformer (CBR) incorporates a series of air pollution control equipments like Alkaline scrubbers that capture the Chloride ions alongside other pollutants and renders a clean gas to be delivered to the engine



How does the Concord Blue Reformer deal with Heavy/Contaminated Metals?

The Vaporization temperature of most heavy metals is well above the temperature profiles of the CBR components. Hence, they will be extracted along with the char, and sieved to ensure that the char doesn't contain any contaminated heavy metal. None of this, will go out with the gas, thereby ensuring that the gas remains free of pollutants.

THANK YOU

