The finished 1.5 kilowatt unit that can provide all the power that a household will ever need.

Every country, in general, is hostage to energy dependence and at the mercy of the finite sources of natural energies within itself and the limited and scarce supply around the globe.

About a year ago, I received an e-mail sent by a business associate giving me a heads-up on a Green Renewable Energy he wanted to commercialize globally.

This past summer he invited me to be part of his global team and hosted my visit to a formal presentation and tour of the Watt Fuel Cell Technology facility right here in New York.

I got very excited, realizing that this state-of-the-art technology could very much benefit the

Philippines, where rampant power outages and high cost of electricity stand in the way of growing a robust economy.

This energy source is also much needed by the rest of the world, among developed or emerging nations.

What is a fuel cell?

Electrochemical electricity generation mostly comes from closed electrochemical cells (“batteries”), which are arguably utilized more as storage systems than generation systems, but open electrochemical systems, known as fuel cells, have been undergoing a great deal of research and development in the last few years.

Fuel cells can be used to extract power either from natural fuels or from synthesized fuels (mainly electrolytic hydrogen) and so they can be viewed as either generation systems or storage systems depending on their use.

Batteries hold a closed store of energy within them and once this is depleted the battery must be discarded, or recharged by using an external supply of electricity to drive the electro-chemical reaction in the reverse direction.

A fuel cell, on the other hand, uses an external supply of chemical energy and can run indefinitely, as long as it is supplied with a source of hydrogen and a source of oxygen (usually air).

Fuel cells are electro-chemical devices that produce electricity and heat by an electro-chemical reaction in which oxygen and a hydrogen-rich fuel combine to form water.

Unlike conventional engines, they do this without burning the fuel and are therefore generally cleaner and more efficient.

Both batteries and fuel cells convert chemical potential energy into electrical energy.

Fuel cells actually have been known to science for more than 150 years.

As early as 1839, Sir William Grove (often referred to as the “Father of the Fuel Cell”) discovered that it may be possible to generate electricity by reversing the electrolysis of water.

It was not until 1889 that two researchers, Charles Langer and Ludwig Mond, coined the term “fuel cell” as they were trying to engineer the first practical fuel cell using air and coal gas.

While further attempts were made in the early 1900s to develop fuel cells that could convert coal or carbon into electricity, the advent of the internal combustion engine temporarily quashed any hopes of further development of the fledgling technology.

In recent years, a number of manufacturers, including major auto makers, and various federal agencies have supported ongoing research involving the development of fuel cell technology for use in fuel cell vehicles (FCV) and other applications.

Fuel cell energy is now expected, sooner than later, to replace traditional power sources.

These fuel cells can be multi-megawatt systems for large centralized power generation, small units (e.g. 1 kW) for backup power, or 1 kW-3 MW systems for homes, buildings, and distributed generation applications and even battlefield power, to mention a few.

There are several different types of fuel cell but they are all based around a central design.

A fuel cell unit consists of a stack, which is composed of a number of individual cells.

Each cell within the stack has two electrodes, one positive and one negative, called the cathode and the anode.

The reactions that produce electricity take place at the electrodes.

Every fuel cell also has either a solid or a liquid electrolyte, which carries ions from one electrode to the other, and a catalyst, which accelerates the reactions at the electrodes.

The electrolyte plays a key role — it must permit only the appropriate ions to pass between the electrodes.

If free electrons or other substances travel through the electrolyte, they disrupt the chemical reaction and lower the efficiency of the cell.

Fuel cells are generally classified according to the nature of the electrolyte (except for direct methanol fuel cells which are named for their ability to use methanol as a fuel), each type requiring particular materials and fuel.

Each fuel cell type also has its own operational characteristics, offering advantages to particular applications.

This makes fuel cells a very versatile technology.

What is distributed grid?

What excited me most is to have seen first hand the most advance works in the production of a Fuel Cell Device that has all the features described above but also delivers the efficiency, cost-effective environmentally-friendly, mobile or stationary, portable power generating device that can be used by the masses now onsite, unlike the big traditional power plants that takes a minimum of three years to produce, set up, and benefit the end user.

This on-site generation of electricity (also called, distributed generation, dispersed generation, embedded generation, decentralized generation, decentralized energy or distributed energy), generates electricity from many small energy sources.

It reminds me of the early days of computers when mainframes were the only ones available till the personal computers became available commercially.

Today, PCs are a part of almost every household.

Most countries generate electricity in large centralized facilities, such as fossil fuel (coal, gas powered), nuclear, large solar power plants or hydro-power plants.

These plants have excellent economies of scale, but usually transmit electricity long distances and negatively impact the environment.

Distributed generation through fuel cells allows collection of energy from many sources, has lesser adverse impact on ecology, and provides improved security of supply.

What I saw was not a science project but truly a deployable Fuel Cell System device that can provide solutions to benefit mankind now.

Furthermore, while most large scale thermo-electric power stations consume considerable amounts of water for cooling purposes, the by-product of Fuel Cells in the process of generating electricity is water!

Historically, central plants have been an integral part of the electric grid, in which large generating facilities are specifically located either close to resources or otherwise located far from populated load centers.

These, in turn, supply the traditional transmission and distribution (T&D) grid which distributes bulk power to load centers and from there to consumers.

These were developed when the costs of transporting fuel and integrating generating technologies into populated areas far exceeded the cost of developing T&D facilities and tariffs.

Central plants are usually designed to take advantage of available economies of scale in a site-specific manner and are built as “one-off” custom projects.

These economies of scale began to fail in the late 1960s and, by the start of the 21st century, Central Plants could arguably no longer deliver competitively cheap and reliable electricity to more remote customers through the grid, because the plants had come to cost less than the grid and had become so reliable that nearly all power failures originated in the grid.

Thus, the grid had become the main driver of remote customers’ power costs and power quality problems, which became more acute as digital equipment required extremely reliable electricity.

Efficiency gains no longer come from increasing generating capacity, but from smaller units located closer to sites of demand.

For example, coal power plants are built away from cities to prevent their heavy air pollution from affecting the populace.

In addition, such plants are often built near collieries to minimize the cost of transporting coal.

Hydroelectric plants are by their nature limited to operating at sites with sufficient water flow.

Low pollution is a crucial advantage of combined cycle plants that burn natural gas.

The low pollution permits the plants to be near enough to a city to be used for district heating and cooling. http://en.wikipedia.org/

What I saw and learned from the tour was not a science project but truly a deployable Fuel Cell System device that can provide solutions to benefit mankind now.

I learned that the U.S. Department of Defense has already tested and adopted this company's technology.

Delivery is scheduled for mid-February 2013.

The Future of Electricity Generation is here and the author, as part of this global commercialization team, is anxious to place his country of birth, the Philippines, in the forefront of this amazing technology.

Identification of the appropriate Joint Venture Partners is underway.

It is my goal and my wish, with the blessings of my team and my joint venture partners, to have my native country to be the first to manufacture this renewable energy source, be the hub of distribution for Asia-Pacific, and create jobs and economic security for these countries.

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For more details, please e-mail amazing.advantage@gmail.com or phone 1-212-567-3411.