



Institution of Engineering and Technology

# IET Ottawa

Oct 2007 Newsletter

Web Site: [www.iee-ottawa.org](http://www.iee-ottawa.org)

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Secretary: Hudson Egbert,

## October Technical Meeting:

**“Renewable Hydrogen - How to put Ottawa on the World Energy Map?”**

**Daniel Aklil – Managing Director, Pure Energy™ Centre”**

**Courtside A Room, RA Centre, 2451 Riverside Drive**

**Thursday 11 October, 2007, 6:30 pm for optional dinner – 8 pm for the presentation**

Dr. Daniel Aklil, MD of the Pure Energy Centre based in the Shetland Isles will talk about hydrogen technologies and how they can put an Island on the World map. He will speak about the first community owned hydrogen project in the world which supply 5 business units with heating and electrical supply, while the grid is used as backup. Topics will cover the history of the PURE, the present and its future. It will also cover how a hydrogen project can put Ottawa on the world map!

Dr. Aklil is Managing Director of Pure Energy™ Centre, Chairman of the Institute of Engineering and Technology Scotland North Network and Director of the Scottish Hydrogen and Fuel Cell Association. Dr. Aklil has over 15 years experience as a Non-Executive Director to SMEs with principal area of expertise in strategic direction, business planning and strong deployment of financial controls.

Dr. Aklil is a frequent speaker at Energy and Hydrogen conferences. He is the author and co-author of over 30 publications. He is a trilingual French, English and Arabic business leader. He held several key posts such as Member of

the Executive Team Professional Network for a Sustainable Future, Engineering Director of siGEN Ltd, Principal Engineer at Regentech, and Project Officer at the Robert Gordon University. He has developed expertise in electronics, control systems, feasibility studies, project management marketing, and business leadership.

The presentation is open to all. Please reserve (state if dinner is required) by contacting Hugh Reekie [max-com@allstream.net](mailto:max-com@allstream.net) or phone 613-728-5343.

Thursday 11 Oct 2007, 6pm meet the speaker in the presentation room. 6.30 pm for optional dinner - 8.00 pm for the meeting.

Park in the East lot of the RA Centre and enter by the corner door. Dinner reservations appreciated by 15 Nov, but walk-in dinners without reservations are acceptable.

### How to get there:

The RA Centre is located near Bronson and Riverside Drive.

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## Report From The Chair

The AGM in May saw the outgoing committee leaving the Ottawa Network in a very strong position. Throughout the year it had run a program of highly interesting talks and on-site visits; it had kept its finger on the pulse of the changes happening across the Institution as a whole and it had kept local members apprised of all this, via the pages of this newsletter. Thanks are due to the outgoing committee, in particular Hugh Reekie in his role as Chair; but also responsible for organising many of those talks and visits. Thanks also go to Frank Johnson for doing his sums as the Network Treasurer.

The incoming committee was little changed in line-up although we did see the departure of Eric Dodman. We would like to thank Eric for all his contributions in the past and we hope to see him at some of the events we lay on this session. Two new people joined the committee Matthew Foster and Stan Xavier. We heartily welcome Matthew and Stan on-board. There was a complete change of Executive

responsibilities however. I resigned my three year tenure as Secretary and now take on the challenge of Chair. Hudson Egbert takes over Secretary and Bhagvat Joshi will be casting his eye over the accounts as our Treasurer. Hugh takes on a new position as Events Coordinator which really means that he'll carry on finding interesting speakers and fascinating places to visit. I wish all of the committee well for the 2007-08 session.

This year we'll continue to plan interesting talks and visits and there will also be the traditional annual dinner in November. We have a budget to bring in one or two speakers from farther afield so we should be getting some interesting talks. I invite all members to come along to any event that takes their fancy. Please bring any colleagues or friends who might also be interested. If you've never attended one of these events then I would like to propose that perhaps this is the year for you to try one or two out. The events I've attended recently have been very stimulating and I have left them

thinking that my life was far more fulfilled and enriched than if I'd stayed home and watched telly instead. Most events have an optional social aspect that usually involves a pub supper and a pint or two of your most particular. There is also the opportunity to informally network with other attendees and perhaps discuss how to put the World to rights or simply figure out who should open the batting for England.

Besides being active at the local level the Ottawa committee is very active at higher levels within the Institution. Colin Billowes was on the SGM working party that formulated the new bylaws for the Institution and determined its new direction. He now takes his seat again on Council who advise the Trustees on how to run the Institution. John Vines is on the Regional Representatives Committee which communicates local Network issues directly to IET HQ and Hudson Egbert is on the Younger Members board – getting more votes than any other non-UK candidate. So you'll see that we are very well placed to continue keeping our eye on the activities of the IET. Consequently, from within these pages we'll keep you informed of what the IET is up to in the UK and also overseas, particularly in North America.

Finally I'd like to report on this year's North American Forum held in Boston, in September. Committee members from all of the North American Networks showed up (Colin,

John Vines and I went from Ottawa). We were sequestered in a hotel for two days and discussed all aspects of the IET as they apply to the North American situation. Robin McGill the new Chief Executive and Secretary of the IET was present. At a dinner on Saturday night he gave the delegates and other members of the New England Network, who were hosting the event, his view of the future of the IET. In a nutshell it is to encompass as broad a range of engineering disciplines as possible; to become a global organization where India, China and North America are key regions; to provide members with digital access to large amounts of engineering knowledge and expertise; to get the message of engineering out to as many members of the public as possible and to recruit new and younger members.

I would like to take this opportunity of wishing every member who receives this newsletter a healthy and happy year which hopefully might involve taking in an Ottawa IET event or two.

Stay tuned. It's going to be an interesting year.

**Martyn Delbridge**  
**Chair**  
**IET Ottawa Network**

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### **Report on the Technical Site Visit:**

#### **IET/IEEE Visit to Plasco Waste Gasification and Co-generation Plant (21 July 2007)**

##### **prepared by Geoff Turner**

About 20 Professional members attended this plant tour, exceeding the planned numbers. As a result the group was split into two consecutive tours of the plant owing to limited visitor safety apparel. Many thanks to both the organizers – Hugh Reekie & Stan Xavier - and to Plasco for such an interesting visit to a world leading technology and plant.

Ken Campbell, VP Operations of Plasco, enthusiastically provided the tour of the facility that has been built by Plasco to demonstrate to the city of Ottawa - and others - how this plant tackles the environmental problem of waste disposal and of dumping 'semi-toxic' waste into landfill at the same time as generating electricity with minimal impact to the environment. The economics, feasibility and benefits of this Plasma Gasification process is being demonstrated as a larger scaled up version of their R&D facility in Castellgali, Spain.

He noted that this group was the first public tour of the plant after they had run its first trial a few days earlier - to check systems and iron out control problems. This had been done with simulated municipal waste, as the plant has not yet obtained city approvals to fire up with the real feedstock; the plant was not operational at the time of the visit.

The process is significantly different from waste incineration plants, in that it uses a patented Plasma Gasification process to consume and turn the carbonaceous materials into "syngas", which in turn operates efficient gas engines to generate electricity for local distribution.

##### **Storage and Handling**

The tour started in the storage and handling area, where the municipal waste is dumped by the garbage trucks onto a large concrete floor in an enclosed building. From there a front loader loads a hopper and feed belt which exits through the wall to the processing plant.

The building is "enclosed" to assist in confining the odours of rotting garbage. This is further aided by a slight negative pressure created by drawing the air needed for the process from the building through the feed tube. The handling floor will be washed daily when in production - for obvious reasons.

##### **Gas Production and Refining**

The next stage of the tour followed the process to gas production and refining stage, which is in the open air: feeding equipment shreds the feedstock, separates ferrous metals, and loads the lower brick-lined section of the gasification chamber. This is heated initially using propane to around 300-350C and gasification of the material begins. Oxygen content is carefully controlled to avoid ignition. Also, at this stage an auxiliary feed for adding hi-carbon waste (plastics currently not recycled) is provided to balance the "mixture" against the inconsistency of municipal waste. Once the process is started, it becomes self-heating.

The hot gases and solid matter are drawn up into a top chamber where they are further heated to around 1000°C by the plasma torches and this is where "cracking" to break down the long-chain molecules (toxic and others) to both simple gases and molten slag takes place. The process is carefully monitored and controlled to produce a consistent quality of syngas, by varying the ratios of hi-carbon input to municipal waste and many other parameters, all of which Ken explained; they are covered by patents and 'know-how'.

The rest of the refining plant, amounting to several large vessels and columns and many large pipes, cools the gases using a water quench, separates the solid slag and dust, removes farm grade sulphur, and finally a carbon filter catches the remaining trace elements that are not wanted as part of the syngas – used to power the engines or be released to the air. A blower also moves the gas forward to large low-pressure storage tanks that

provide about a two hour capacity for the generating sets. The whole process is operated at relatively low pressures.

In the rare event that the power generated cannot be put into the local distribution system, for safety reasons the excess syngas is burned off using a flare.

#### **Power Generation**

The last part of the plant, on the other side of a separating and access roadway, is the gas engine power generating sets, the electrical control and switchgear and also the 3 phase transformer to match to the 27KV local distribution network. Ken noted that it was preferable to feed power locally rather than add to or burden the main distribution network.

#### **Ottawa Demonstration Plant facts:**

- The Ottawa plant has 5 General Electric 4160 Volt generating sets, each capable of generating 720KW
- The Ottawa demonstration plant's capacity is 85 tonnes per day, generating around 1400 KWH per tonne of solid municipal waste, or about 4.9MW per hour.
- Syngas is about 10% the energy value of natural gas.
- The plant (will) operates on a 3 person per shift and 4 shifts per day basis.

- About 25% of the energy input in the form of solid municipal waste is used to 'fire' the process. i.e. about 75% comes out as useful heat or electricity.

- There is no large smokestack.

- Currently the city pays Plasco the nominal disposal rate per tonne of \$40 to take the waste.

- Ottawa City has "conditionally" agreed to build a larger plant using the same technology.

- Plasco gets paid "green" energy rates for its power supplied to the network.

- The slag and solid output from the process is approximately 1:1000 the volume of the feedstock, and could be sold or reused as material for road aggregate or construction. In any event it can also be put in landfill, as it is non-leaching and harmless.

#### **Links and further Information:**

<http://www.zerowasteottawa.com>

<http://www.plascoenergygroup.com>

<http://www.plascoenergygroup.com/content.php?cat=tech>

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### **Report on the Technical Meeting:**

#### **Super DARN – an HF radar to investigate the northern ionosphere (25 July 2007)**

##### **Prepared by Hugh Reekie**

Some twenty engineers attended an "evening of opportunity" at the Crownsnest, Naval Officer's Mess on Wednesday 25th July. This is an unusual time of the year for a presentation, but an enthusiastic, informed and available speaker was in town. Through arrangements with David Boteler, Prof George Sofko of the University of Saskatchewan gave a presentation on Super DARN – an HF radar to investigate the northern ionosphere.

To ease the pain of jumping into such an intensely technical subject, organizer Hugh Reekie started off the evening with a review of other HF radars, developed since WWII. With sufficient power, these radars have ranges over 2000Km, and can detect ocean wave patterns, aircraft and small ocean vessels; one such system, the French Nostradamus Radar, was described. Low-cost HF radars are available, too: using omni antennas and sophisticated computer processing, CODAR radars have been developed to give accurate sea-state and ocean current information for smaller ranges.

SuperDARN is an International Radar Network of 11 specialist HF Radars used for Studying the Earth's Upper Atmosphere, Ionosphere, and Connection into Space; see

<http://superdarn.jhuapl.edu/index.html>. Prof Sofko is responsible for radars at Rankin Inlet, Prince George BC and Saskatoon; he gave an overview of the entire program and then presented examples of web pages which give real-time results, useful for researchers. George's lucid displays and descriptions were understood by most.

Each pair of SuperDARN Doppler radars is capable of measuring a large-scale map (about 4 million square kilometers in size) of the two-dimensional convection, the electric field and the field-aligned currents (FACs) in the F-region of the ionosphere. These electric fields and FACs are generated in the outer regions of the earth's magnetosphere where the solar wind interacts with the earth's magnetic field, and they are a direct measure of the transfer of energy from the solar wind to the earth.

Attendees included specialist Radar researchers, those interested in radar (past and present), and some who were just curious. There was much chatting over glasses of beer during the interval.

**The 2007/2008 Ottawa Network Committee consists of:**

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**YOUR EMAIL ADDRESS**

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