Foreign Affairs and International Trade Canada
Affaires étrangères et Commerce international Canada
Canada

The Canadian Trade Commissioner Service

Smart Grid Partnering Mission to Europe

(November 3-14, 2012)

Delegates' Profiles

Awesense Wireless Inc.

Awesense Wireless Inc. helps utilities reduce energy loss and increase profits by using an easy to deploy line measurement system. It addresses the issue of energy loss in the distribution system due to antiquated infrastructure and power theft. On average, a utility has avoidable losses per of $3M per 100,000 homes. In North America, over $25B in electricity is lost every year, and $10B of this is related to non-commercial losses such as power theft. The Awesense system consists of mobile wireless smart sensors that can be quickly deployed within the distribution grid to help identify key areas of electrical loss. Sensors communicate wirelessly with each other to self-form the network. Each node can be clamped onto the electrical utility wire to measure power without the need for a service disruption. The smart sensors, communicate with a powerful backend analytics software suite senseNET, which help the utility company make the right decision about how to mitigate losses and plan for the future.

Delegate's Name and Title

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CEO and Founder

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Areas of Expertise in the Company

- Wireless Portable Power measurement devices
- Data collection and reporting applications
- Power theft analytics
- Software development
- Power theft consulting

International Partners/Strategic Alliances

- ELO Sistemas Electronicos, Brazil and S.A.
- Kazanc Energy, Turkey
- Intellimeter Canada Inc.
- Clevest Solutions Inc. Canada
- Cisco Systems Inc. USA

Objectives for participating in this mission

- Potential suppliers for manufacturing or parts
- Potential value added resellers to European market
- Better understanding of the European electrical market

British Columbia Institute of Technology

Delegate's Name and Title

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Scientific Director and Principal Investigator

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Areas of Expertise in the Institution

- For Energy Providers and Utilities:
  - Operational Efficiency, including Volt/VAR optimization, Conservation Voltage Reduction, Substation Automation, Load Balancing and Demand Response
  - Distributed Energy Resources (DER), including integration and control of intermittent sources of energy, such as wind, solar, etc.
  - Quality of Service Improvement, including Advanced Metering Infrastructure (AMI), Loss, Theft and Tampering Detection and Control, and Customer Portal
- For Energy Consumers and Communities:
  - Energy Management, including Load management, Cost Reduction, etc.
  - Energy Reliability and Security, including redundancy and Smart Distribution
  - Rural Electrification, including turn-key system design for electrification of off-grid and rural communities, campuses, Army's forward operating bases, etc.

International Partners/Strategic Alliances

We are currently engaged with GE, ABB, SEL, Panasonic, Siemens and Schneider in various project related to our Smart Microgrid initiative.

Objectives for participating in this mission

- To learn about Smart Grid activities and initiatives in Europe
- To seek collaboration and partnership on our existing and future projects
- To pursue opportunities for which we could offer our services and technologies

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Department of Foreign Affairs and International trade (DFAIT)
- Cleantech and Infrastructure Division

The mandate of the Cleantech and Infrastructure Division at the DFAIT is to promote the Canadian expertise abroad and facilitate partnerships between the Canadian companies and research institutions with their potential partners from other countries. In order to achieve this, we take advantage of DFAIT's wide network of Trade Commissioners who are located around the world and in different regions in Canada. The focus of this division is on a wide spectrum of clean technologies related to water, green energy technologies, such as wind, solar, biomass, and also energy infrastructure. Smart grid has a special status at the core of activities within this division, because this field of technology relates to all the issues concerning the integration of digital technologies, distributed energy and electric vehicles in the grid infrastructure.

Delegate's Name and Title

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Senior Science Advisor

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Areas of Expertise in the Institution

The Cleantech and infrastructure Division has strong focus on the promotion of the following technologies:

- Renewable energy technologies such as solar, wind, biomass, hydro electricity
- Hydrogen and fuel cell technologies
- Waste to energy
- Energy storage
- Smart grid

On a personal level, I have been involved in research in the areas of catalysts and materials development for batteries and fuel cells. I have worked specifically on zirconia and beta-alumina for applications in batteries and solid oxide fuel cells. Also, I have been engaged substantially in the development of Eco-materials for reducing the environmental impacts.

International Partners/Strategic Alliances

I have developed several international R&D collaborations with Japan, Germany, the UK, France and Switzerland in a wide spectrum of materials development for environmental and energy applications.

Objectives for participating in this mission

The main objectives of my participation in this mission are:

- To obtain the most up-to-date intelligence on the Europe's current strategy for promoting and implementing smart grid technologies;
- To gain knowledge on the overall status of the electricity generation mix in Europe;
- To learn about European technology needs vis-à-vis integration of ITC in grid structure, energy storage, infrastructure for the integration of Electric Vehicles in the grid, issues related to distributed energy, etc.

dTechs

Founded in 2006, enables electric utilities to wirelessly monitor their distribution grid, allowing them to detect and prevent technical and non-technical energy losses. dTechs cost effectively addresses the last mile 'gap' in monitoring by using highly accurate medium voltage (MV) monitoring sensors (plug & play) and software. Our system reconciles with both analog and Smart Meter endpoints for highly accurate line loss estimates. Our system includes creating an impeachable GIS grid database for the Utility. dTechs functionality includes high resolution current readings, high accuracy voltage readings, immediate outage notification (OMS), atypical consumption (theft), energy harvesting on MV, directional Load and fault, full fault sensing, thermal demand reporting, harmonics, power factor, and a full array of adaptable communications. dTechs sensors are easily installed into medium voltage locations in the grid and wirelessly report full power readings to our utility integrated software platform. The utility now has complete grid visibility, searchable database, and automated grid threshold alerts. Our Medium Voltage data has a 1:1 ratio with secondary low voltage monitoring which allows for a dramatic cost reduction for utilities in hardware, data storage, maintenance, and utility field operations.

Delegate's Name and Title

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Areas of Expertise in the Company

- Analyzing atypical electrical consumption
- Theft of Power – line loss – technical /non technical
- Privacy Rights – Code of Conduct regulations (Consumer and Institutions)
- Organized Crime

International Partners/Strategic Alliances

- Original Equipment Manufacturer (OEM) – Cooper Power Systems
- Member – Skolkovo Innovation Centre, dTechs Russian Co. active Q1 2013
- Tantalus – tantalus.com – (Caribbean Projects)
- CapGemini

Objectives for participating in this mission

dTechs wishes to broaden their global exposure and seek foreign interest in our systems. dTechs technology is first in the world to incorporate high resolution current (amp) readings and high accuracy voltage readings at the medium voltage location in the grid. Interest may be from actual Utility Co's or possible partners/strategic alliances.

Electrovaya Inc.

Electrovaya designs and manufactures Lithium Ion SuperPolymer® electrodes, cells, battery management systems (BMSs), mechanical subsystems, thermal subsystems, electrical subsystems, and complete energy storage solutions for both automotive and stationary storage. Electrovaya is a public company listed on the Toronto Stock Exchange under the symbol “EFL”. Headquarters are located in Mississauga, Ontario, Canada.

Grid Storage: Electrovaya has several major utilities as clients, such as Arizona Public Service (APS, $3.5B annual revenue), Hydro One ($17.3B in assets), Manitoba Hydro ($12B in assets), Chubu Electric (Japan’s 3rd largest utility with $30B annual revenue), and many others. A video of Electrovaya’s installation in Arizona can be seen at http://www.youtube.com/watch?v=zNMclgXUUqw.

Electric Vehicles: Pike Research has recently identified Electrovaya as one of the top ten electric vehicle battery manufacturers in the world. Electrovaya supplies electric vehicle batteries for Chrysler’s RAM Plug-in Hybrid Electric Vehicle (PHEV), Chrysler’s Minivan PHEV, Hero, and many other OEMs in North America, Europe and Asia.

Technology: Electrovaya produces its patented Lithium Ion SuperPolymer® batteries through a unique non-toxic process. Electrovaya’s innovative technology provides superior energy density and has resulted in 170 global patents.

Delegate’s Name and Title

Dr. Sankar Das Gupta, Ph.D., DIC
Chief Executive Officer

OR

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Areas of Expertise in the Company

Dr. Das Gupta is the Chairman and CEO of Electrovaya. He received his doctorate from Imperial College in London. He serves as an Adjunct Professor in the Faculty of Engineering at the University of Toronto.

Objectives for participating in this mission

Electrovaya's objective is to further its network of potential partners in Europe for the manufacture, sale and distribution of lithium ion battery systems. Also, looking for technology partnerships with potential companies in Europe.

ENBALA Power Networks

ENBALA Power Networks is a Smart Grid company that captures process storage that already exists in the power system and makes it available as a service to electricity system operators. Far beyond traditional demand response, the ENBALA Power Network engages large-scale electricity users (loads) to participate in the *real-time management* of the power system. By capturing, and then intelligently aggregating inherent flexibility in how loads (such as water plants, cold storage facilities and other industrial facilities) use power -- by taking advantage of storage inherent in their processes -- the ENBALA platform can offer robust, reliable and resilient demand-side management solutions to power system operators or distributors.

ENBALA is delivering a true Smart Grid application that links flexibility in electricity users to the real-time needs of the power system.

ENBALA is already providing Regulation Service in the competitive PJM market in the United States and is providing wind integration to New Brunswick Power in Canada. In addition, ENBALA is at various stages of implementations with a number of other North American ISO's and utilities.

Delegate's Name and Title

Ron Dizy
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Areas of Expertise in the Company

ENBALA's intelligent Smart Grid technology platform responds in real-time to the always changing needs of the electricity system through the engagement of demand-side loads and their inherent flexible process storage.

The platforms areas of expertise:

- Increase the power systems reliability and efficiency
- Integrate distributed generation
- Engage demand-side loads

International Partners/Strategic Alliances

ENBALA is in discussions with a variety of organizations both locally in North America as well as internationally. ENBALA plans on expanding its platform internationally and will partner directly with Independent System Operators and Utilities. Additionally, ENBALA is already developing broad strategic alliances with organizations that have a common goal to modernize the electricity system.

Objectives for participating in this mission

- Establish relationships with European system operators; understand their current and future needs, with a few to piloting the platform in several European systems
- Develop strategic partnerships
- Learn about current initiatives underway in European power systems

e-Radio Inc.

e-Radio Inc. enables Smart Grid and CRM (customer relations management) communication by leveraging existing FM broadcast infrastructure.

Delegate's Name and Title

Jackson K. Wang, P.Eng.
President and CEO

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Areas of Expertise in the Company

- Engineering R & D
- Broadcast data-casting software
- Receiver module design
- OEM integration

Our solution has the following characteristics:

1. Leverage multi-billion dollar EXISTING infrastructure
2. Can build out entire continental coverage in a matter of months not years
3. Capital and operating costs a small fraction of alternative communication solutions
4. Fully compatible with optional Home area networks or Home Energy Management systems
5. Preserves user privacy (similar to road traffic report)
6. Automatic & Self installing receivers (auto-search & lock on local carrier signal)
7. Encryption enabled for message authentication

International Partners/Strategic Alliances

- active NDAs in place

Objectives for participating in this mission

- Expand global activities via possible European partners including but not limited to applications in:
    - Real Time Demand Response
    - Frequency Regulation
    - Grid Scale non battery Storage
    - Renewable generation integration
    - Customer Relations management messaging
    - Location Based services via broadcasting

Essex Power Corporation

Essex Power Corporation is a dynamic energy company that provides safe, reliable and economical energy supply and services to our customers. Our commitment to innovation, performance management and leading by example has built the foundation for Essex Power and our affiliates to establish a diverse set of energy products and services that are valued by our customers.

Essex Energy Corporation is one of our affiliated companies. Essex Energy is a dynamic company focused on spearheading a vast array of energy related initiatives. With the passing of the Green Energy Act in Ontario, Essex Energy is primed to move these initiatives forward by offering a full suite of Energy Related products and services including renewable energy systems, distributed generation opportunities and a variety of software and consulting solutions.

Utilismart Corporation, our affiliated company provides a wide range of meter data management service to Utilities, Industrial and Large Use consumers in the electricity market place. Utilismart Corporation operates a web-based service that provides you with the information needed to make informed business decisions about your electricity usage. *HealthMAP*, a product of Utilismart Corporation, is a secure map-based web portal that leverages meter data to manage network overloading, under/over voltage, power outages and network losses.

WattsWorth Analysis Inc. offers a variety of energy management services to clients in the Ontario market. WattsWorth creates and delivers independent analytical services for large energy consumers that enable customers to reduce energy costs and manage risk.

Delegate's Name and Title

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Areas of Expertise in the Company

Essex Power and our group of companies specialize in a broad area of expertise across the utility sector. These include: asset management, “lean” utility operational process, engineering and long term planning, data management and presentation specific to the needs of utility customers, operators, engineers and planners, smart grid technologies that convert data elements from all sources of technologies into useful decision making tools.

Objectives for participating in this mission

To establish strategic partners (both customers and businesses) to increase our footprint where our technologies are deployed which are mainly in North America today and to better understand the market drivers of innovation in the European utility sector

Hydro-Québec

Hydro-Québec's Profile:

- Québec government is sole shareholder
- Largest electrical utility in Canada
- Generation, transmission and distribution
- 22,500 employees, 4M customers, $12B total revenue, $3B net income
- 37GW peak power, 58 hydroelectric generating stations (98% renewable energy)
- 33,450 km of transmission lines, 112,000 km of distribution lines
- $18B projects under construction
- Technology Group (2,750 employees in RD, IT & Telecomm)
- Only power utility in North America with a major research centre

Strategic Plan: 3 Major orientations

- Technology innovation ($100M / year)
- Renewable energy (4,000 MW of Wind power by 2015)
- Energy efficiency (Target : 11 Twh by 2015)

IREQ's Profile:

- Total staff: 480, mostly scientists, engineers and technicians
- R&D budget: $100 million/year
- Open innovation: more partnerships than ever before
- Stage-gate® and portfolio management
- $5M contribution to Québec universities (18 research chairs)
- Two-pronged Mission :
  - Improve grid performance and set up grid of tomorrow (smarter, more independent)
  - Create value for customer and shareholder

Delegate's Name and Title

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Areas of Expertise in the Company

Major Technological Challenges:

- SmartGrid
- Optimal management of aging assets
- Energy efficiency
- New sources of renewable energy
- Battery materials and electric transportation

8 Major fields of expertise:

- Electrical equipment
- Materials science
- Robotics and civil engineering
- Mechanical engineering, metallurgy and wind-hydro power
- Measurement and information systems
- Power systems and mathematics
- Energy use
- Energy storage and conversion

Cutting-edge Facilities:

- High-voltage laboratory
- Mechanical and thermo-mechanical laboratory
- Power system simulation facilities
- High-performance computing centre
- Transmission and distribution test lines
- Materials characterization laboratory
- Titanium rapid-prototyping system

International Partners/Strategic Alliances

- ABB, AlstomGrid, British Colombia Hydro, Électricité de France : EDF R&D & RTE, EPRI, GDF Suez, IBM, IERE, State Grid Corporation of China (SGCC)

Objectives for participating in this mission

Develop technology innovation partnerships in the domain of (but not limited to):

- Smart grid:
    - Increasing power transfer capacity
    - WAMS & WACS using PMUs
    - Asset management optimization
    - Load & Distributed energy resources management
    - Grid Storage
    - V2G
    - Distribution Volt / VAR Control & State estimation
- Power network simulation
- Renewable energy integration (wind, solar etc.)

Hydro Ottawa

Hydro Ottawa Limited is a regulated electricity distribution company operating in the City of Ottawa. As the third largest municipally owned electrical utility in Ontario, Hydro Ottawa Limited maintains one of the safest, most reliable and cost-effective electricity distribution systems in the province, and serves over 305,000 residential and commercial customers across a service area of 1,104 square kilometres. As a condition of its distribution license, the company is required to meet conservation and demand management targets established by the Ontario Energy Board.

Delegate's Name and Title

Roger Marsh
Chief Energy Management Officer

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Areas of Expertise in the Company

As Chief Energy Management Officer, Roger Marsh is accountable for the delivery of environmentally responsible conservation and demand management (CDM) programs for residential, commercial and industrial customers. Accountabilities also include the delivery of a full range of expert energy management services for the commercial sector.
Mr. Marsh has over 30 years of private and public sector experience in the electricity industry and he has held senior positions related to high voltage services, customer service and energy management. Specific areas of expertise include; Conservation and Demand Management, Smart Metering Systems and TOU billing, Meter to Cash Processes and Project Management
Mr. Marsh is a Certified Power System Technologist (C.E.T.), is fluently bilingual and holds a General Management diploma from the Sprott School of Business.

Objectives for participating in this mission

First, I want to share with the delegation partners some of the good work we have done in Ottawa and Ontario to improve our electrical system and reduce energy usage in the province. Specific initiatives include conservation and demand management, demand response, smart grid, smart meters, and suite meters.

My second objective is to witness and discuss the good work that European countries are doing to make their electrical grid smarter and specifically I'm interested in advancements around conservation and demand management, eco-districts, electric vehicle charging infrastructures and energy storage.

Obviously, making the contacts and developing relationships with Canadian and European industry partners is also big on my agenda.

SUBNET Solutions Inc.

SUBNET provides smart grid technology and solutions for the electrical transmission & distribution industry. Founded in 1992, SUBNET is a vendor agnostic company with domain expertise in substation automation and IT networking. SUBNET's technology connects any substation device over any communication network to any business intelligence system. Nine of the top 10 US utilities trust and rely on SUBNET technology to safely manage and monitor thousands of substations. SUBNET leverages close relationships and partnerships with technology leaders including Microsoft, Cisco, Intel, McAfee/Nitro Security and others to deliver innovative secure solutions.

SubSTATION Server: SubSTATION Server is a multi-function substation gateway software application that performs: substation data concentration, protocol translation, automation logic, event file collection and secure enterprise connectivity.

SubSTATION Explorer: SubSTATION Explorer 2 is SUBNET's new substation HMI solution for unifying the visualization and control of a utilities critical substation information. In typical IED-based substations, critical information is scattered among dozens of different IED faceplates with obscure menu-driven displays. With SubSTATION Explorer 2, utilities implement a standardized solution that enables the safe, secure and reliable local operation of any and all of your IED-based substations.

PowerSYSTEM Server: PowerSYSTEM Server is a Front End Processor (FEP) solution that enables more comprehensive real-time collection and secure access to the information available in an electrical utilities' intelligent electronic grid monitoring devices.

PowerSYSTEM Center: SUBNET's PowerSYSTEM Center enables electric utilities to centrally manage a diverse array of multi-vendor intelligent electronic devices (IEDs) to facilitate compliance with cyber security (NERC CIP) and reliability regulations. PowerSYSTEM Center provides three core functions: system wide IED configuration change management, IED access control security and IED password management security.

Delegate's Name and Title

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Areas of Expertise in the Company

SUBNET has a unique position in the Smart Grid marketplace because of its expertise in SUBstation automation *and* IT NETworking, hence the name SUBNET. SUBNET is also defined by its vendor-agnostic solutions where the products and solutions SUBNET delivers are specifically multi-vendor to enable connectivity and interoperability between any substation devices over any communication network to any business intelligence application.

SUBNET helps electrical utilities:

- Improve the reliability of their substations by providing secure and easy access to substation device data.
- Maintain a secure network by integrating substation solutions within existing IT infrastructures.
- Reduce substation configuration time significantly by implementing a single tier substation architecture.
- Extend the life of existing assets by using the intelligence of SUBNET software to make old substation devices “smart” and avoid early device replacement.

International Partners/Strategic Alliances

SUBNET Solutions Inc. partners with the following international companies:

- Microsoft: SUBNET is a Microsoft Gold Certified Partner. SUBNET leverages Microsoft technology in its products as well as works closely with Microsoft as a sales channel partner.
- Cisco: SUBNET is a Cisco Developer Partner. SUBNET collaborates with Cisco to develop complementary product offerings.
- Schweitzer Engineering Laboratories, Inc. (SEL): SUBNET works with SEL to supply them with software solutions to include in their substation hardware products.
- Intel: While not a formal partner, SUBNET and Intel work together to create state-of-the-art solutions for the electrical industry. Intel’s expertise in computer processors coupled with SUBNET’s expertise in substation automation applications delivers advanced solutions that make substations more reliable and secure.
- McAfee/Nitro Security: SUBNET is a McAfee Security Alliance Partner. SUBNET works with McAfee/Nitro Security to protect substation automation systems against malware and cyber-attacks.

Objectives for participating in this mission

Evaluate fit of SUBNET products in Europe’s Smart Grid Industry.

Identify opportunities for SUBNET Partners in Europe to market and sell SUBNET products in Europe.