Europe – Canada R&D Opportunities:

A partnership between Celtic Plus and Prompt

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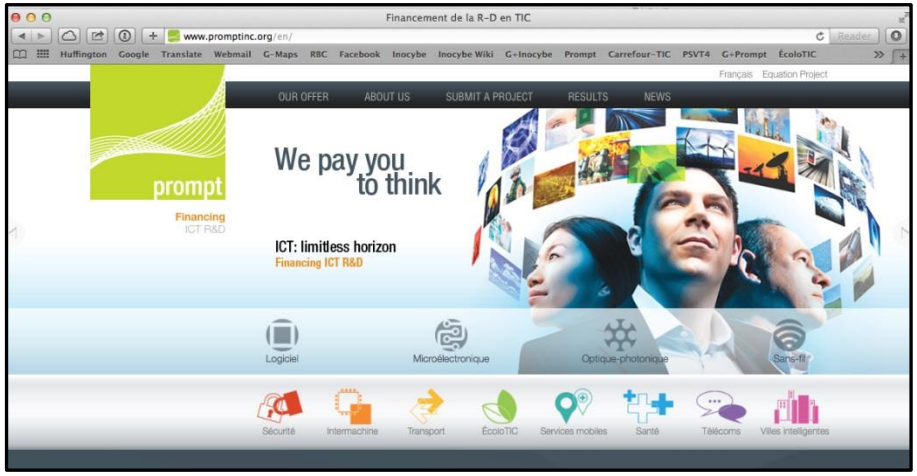
Prompt : Financing R&D in ICT

- Non-for-profit Québec organisation:
  - Dr. Charles Despins, President & CEO:
    - University researcher and Telecom Operator CTO
- 100 R&D partnerships in 12 years:
  - Total partnership value: 150M $CDN.
    - More at www.promptinc.org



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Prompt and Green ICT : Why ?

The elections of Pope Benedict XVI and Pope Francis

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Green ICT: Key Driver of Sustainability

- The challenge:
  - The ICT sector's greenhouse gas (GHG) emissions are similar to those of the aerospace industry: 2% to 4% of worldwide emissions;
  - Largest energy consumption growth rate in all sectors of society … doubling every four years… however …
- The opportunity:
- *Smart ICT* … and … *Smart through ICT* (the « enabling » effect)
  - Annual worldwide energy savings of 1900 billion USD and …
  - Elimination of 16,5% of worldwide GHG emissions;
  - More than 7 times ICT's own footprint;
  - Could be monetized through carbon markets.

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Green ICT: Energy Efficiency and GHG reduction

- Maximize renewable energy to power ICT infrastructures and applications:
  - Leverage virtualization (clouds) in zero-carbon data centres.
- Develop GHG emission standards for ICT:
  - ISO14064 protocol suite is difficult to apply in the ICT sector;
  - Standards to quantify the GHG emission reduction potential of ICT.
- Integrate the ICT industry in future CO_2 economies:
  - Use ICT carbon standards in various cap & trade regimes:
  - USA & Canada: Western Climate Initiative, Regional GHG Initiative, Europe's Emission Trading System (ETS), China: Shanghai ETS.
  - Focus on end-user behaviour & incentives (not just the network).

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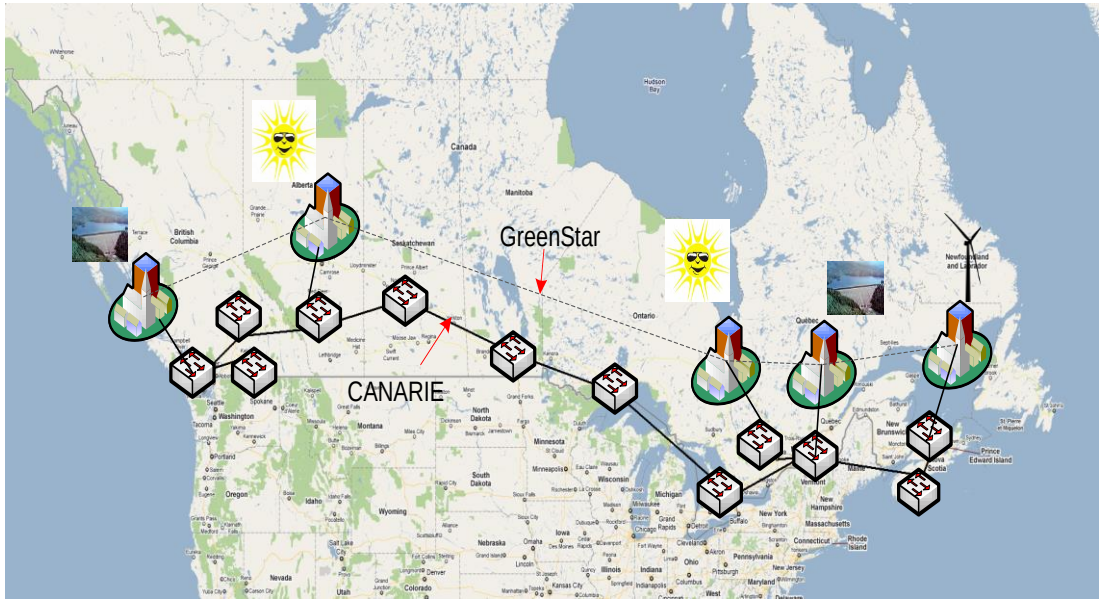
An example: The GreenStar Network

- A Zero-Carbon telecom network pilot project:
  - Network level virtualization and ICT CO_2 protocol;
  - Off-Grid zero carbon energy to power networks and data centres;
  - European collaboration thru PanLab (FP6) and Mantychore (FP7).
  - A federated network is considered.



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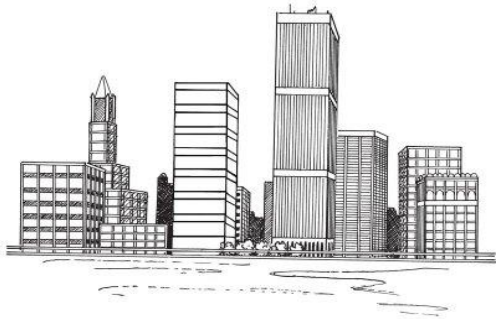
An example: Green ICT Infrastructures

- Linking Environmental & Socio-Economic Benefits:
  - Exploiting Québec's 98% renewable energy:

Digital economy strategy & Appropriation by community

POWER (co-located)



Distribute information, not energy

Energy efficiency $$

GHG emission reductions $$

POWER (distributed)

Arctic Fibre & Keskuun Data Centre Projects

- A 650M$, 15,289 Km, 30 tbps route between Tokyo & London via Canada's Northwest:
  - Bridging the digital divide between major cities and Québec's Great North.
- Québec's James Bay hydroelectric facilities are strategically situated at the crossroad between Asia, Europe and North America;
- An ideal situation for Green Data Centres and test beds in Next Generation Networks:
  - Eeyou Istchee Keskuun Green Data Center Valley project (up to1,000 MW – 8 TWh/yr);

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Celtic-Plus
Smart Connected World

prompt
ICT: limitless horizon
Financing ICT R&D

Equation Mobilizing Project

ΣQUATION
A MAJOR GREEN ICT INITIATIVE
Technology + Ecology = Economy

- 4-Years 70 M$ in Green ICT:
  - Carbon neutral solutions + Climate changes challenges = Economic, Social and Environmental benefits.
- Public-Private Partners, all part of the Equation:
  - 40M$ by 7 Major players & 30M$ by Province of Québec;
  - 7M$ to 30 SMEs & Research Organizations.
- Objectives:
  - Accelerate Industrial development for partners;
  - Building a Green ICT ecosystem;
  - More at www.EquationICT.com

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The Equation Mobilizing Project

➢ Focus of the Equation Initiative:

- Telco Cloud : ERICSSON, FUJITSU, TELEDYNE DALSA A Teledyne Technologies Company, Miranda A BELDEN BRAND
  - Experimental distributed cloud infrastructure for Data Centers
  - Complete multiplatform cloud-oriented end-user workspace solution
- Smart Grid : CGI, IBM, Trilliant
  - Management system to reduce truck rolls in TV and Smart Grid
  - Green manufacturing processes, MEMS components
- Turning towards the International :
  - Economic mission in January 2014 in UK and Sweden
  - R&D partnerships: Horizon 2020, Celtic Plus…

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Prompt R&D Themes : Infrastructure

- Green ICTs :
  - Renewable energy and sustainability, efficient cooling solutions
  - Integration of MEMS and optoelectronic components into silicon;
- Telco Clouds and Green Data Centres:
  - Benefiting from Québec's 98% renewable energy and cold climate
  - Virtualization of telecom functions, network security, multi tenancy
- Next Generation Networks:
  - Distributed architectures, integration & interconnection issues, heterogeneous wired and wireless, SDN & federated networks, mobility, Open Access, 1Gb symmetric, …
- Smart Grid:
  - Cloud-assisted smart grid architectures and Internet-centric development
  - Advanced management solutions and 'Internet of Thing' sensors
- Deploying Broadband:
  - Inter & Intra Data Centre communications
  - 5G Cyber Highway, Municipal Infrastructures

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Prompt R&D Themes : Applications

- Smart processing:
  - High performance computing, Big Data analytics, high definition video processing
- Smart Territories:
  - Smart Grid and Energy management, Emergency measures, etc.
- Smart Transport:
  - Electrification of transport, smart logistics, Maritime solutions
- Appropriation:
  - eHealth, eGovernment, eEducation, eEntertainment, eAgriculture, Open Governments, Carbon economy, etc.

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Interest of Major Corporations

➢ Ericsson Canada:

- Smart corridor, demo test bed, cyber highway between Windsor & Quebec City, 1200 km via Toronto, Montreal and low density rural areas;
- Ubiquitous dynamic, wired/wireless next generation SDN network with experimental radio frequencies linking industry, operators and universities;
- Unique Telco Cloud infrastructure to test digital applications in intelligent cities, eTransport, electric vehicle, smart grid, eHealth, mobility, etc.

ERICSSON

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Interest of Major Corporations

- Thales Canada
  - Development of Urban Sciences:
    - Intelligent Transport:
      - Optimization, monitoring of remote infrastructures, driver behaviour, flexible services.
    - Smart Grid:
      - Big Data analysis.
    - Cyber Security and Urban Security:
      - Protection of infrastructure and social network analysis.
    - E-Health:
      - Prevention, simulation and anticipation of threats;
      - Optimization of control measures.

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Interest of Major Corporations

- Grass Valley a Belden Brand
  - Development of Next Generation Television
    - Intelligent Remote Production:
      - Optimization, monitoring and control of remote infrastructures, driver behaviour, flexible services.
    - Flexible Remote Production:
      - Enable Data Centres like behaviours of production and delivery equipment.
      - On-demand signal conversion, on demand quality of signal, based on generic hardware and SDN.

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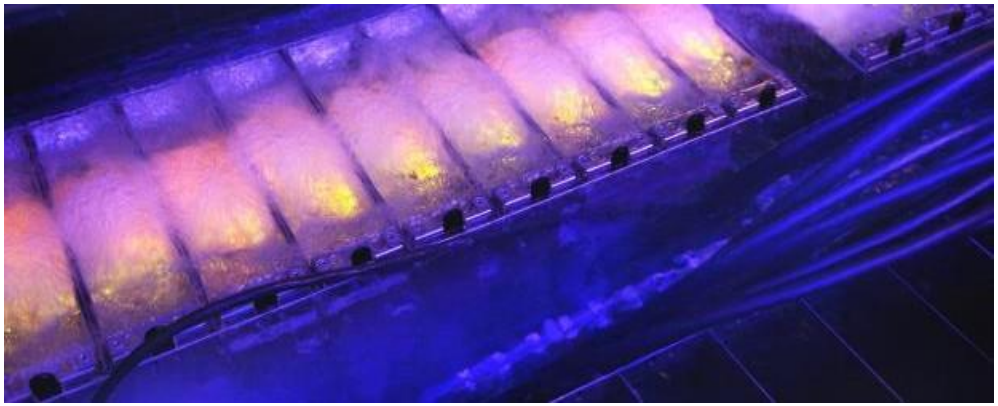
Interest of Small and Medium Firms

➢ Systemex Energies

- Next Generation Data Centres:
  - R-D testing infrastructure: Optimal hardware & software benchmarking
  - High performance Cooling (collaboration with IBM & 3M) : Liquid/Gas phase Control = reduction in Capex & Opex
  - High performance Computing: Unique encryption and encoding solutions
  - High performance Control: Grid friendly Data Centres
  - Integrated Smart Grid & demand response approaches



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Interest of Small and Medium Firms

➢ Civimetrix Telecom

- Next generation Public Data Infrastructures, varying in size from smart buildings to innovation districts, to smart cities in the pipeline.
- Highlights:
  - Montreal-Boston-New York City SDN backbone;
  - Web-scale private networks across shared resources enabling the delivery of innovative services at a lower cost.
- Research Interests :
  - Fibre routing, FTTH optimization, etc.;
  - Multidisciplinary LivingLab;
  - Assisted living, eHealth, security and other future services.

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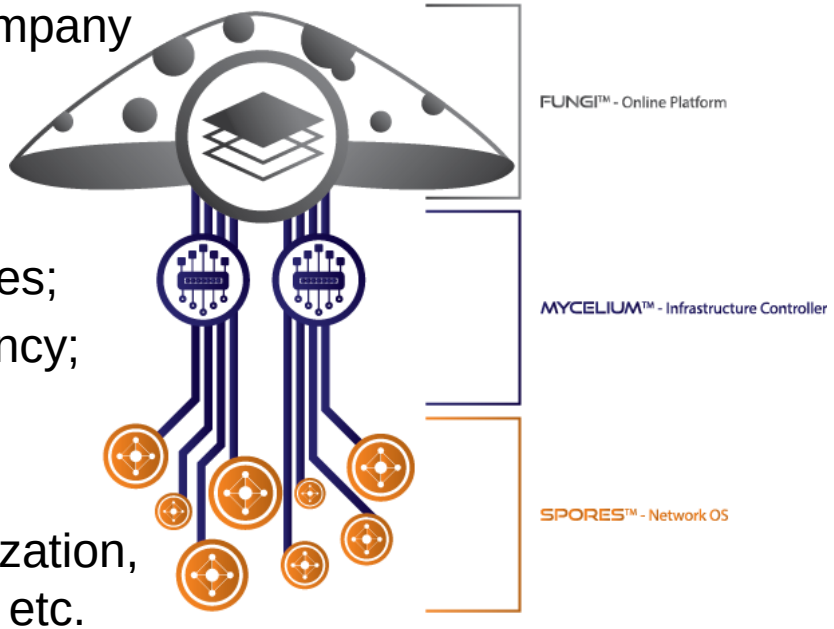
Interest of Small and Medium Firms

➢ Inocybe Technologies

- No 1 pure play OpenDaylight SDN company working on next generation innovation networks;
- Highlights:
  - Networking OS for white box switches;
  - Networking containers for multitenancy;
  - Open Source SDN controller.
- Research Interests :
  - SDN, Network Virtualization, Optimization, fault detection, data plane, security, etc.



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Interest of Small and Medium Firms

➢ Claridion

- "Smart Data Centre" Infrastructure Management :
  - Environmental monitoring and energy efficiency;
  - Security, Control & Automated surveillance;
  - Open Multiprotocol communications.
- Integrated, smart & autonomous operations :
  - Open management platform integrating Building & DC infrastructure management with virtualization layers for data storage and processing;
  - "DCIM as a Service" model.

CLARIDION
MEASURE · MANAGE · CONTROL ·

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Interest of Small and Medium Firms

➢ MetroOptics

- Fibre Optic Sensors :
  - Key to Smart Cities for monitoring health of the city's infrastructure
  - Low cost, high volume sensors for urban facilities infrastructure including the telecom infrastructure

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In Conclusion: Celtic Plus – Prompt Partnership

- Objectives :
  - Stimulate collaborative Industry-driven public private R&D partnerships;
  - Common R&D activities in Europe and in Canada, linking industry, universities and research centres;
  - Increase cross-sector activities to impact our citizens and our Industry, both large and SMEs.
- Proposed activities:
  - Increase awareness, share topics, provide services;
  - Facilitate project funding;
  - Common exploitation of test beds.

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Technology + Ecology = Economy

Thank you for your attention

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