

**CANADIAN GREEN ECONOMY
TRANSITION
DISCUSSION PAPER:**

**COMPREHENSIVE ROADMAP
ON OPTIONS
FOR A BETTER ECONOMIC PARADIGM**

la Communauté métropolitaine de Montréal, 08 03 16

HOW TO MAKE TRANSITION TO NEW PARADIGM: GREEN ECONOMICS

- Much has been said on why we need to reduce dependencies on fossil fuels and clean tech scenarios to be achieved
- Not enough on HOW TO make the transition to a different economic model, green economics
 - Too much said on magic bullets, eg.: price on carbon
 - July 2013 EU [postponed auctioning 900M carbon credits until 2019-20](#)

Roadmap on Fast-Forward Catching-up

- Constitutes a very comprehensive and synergistic fast-forward action plan **based on green economy models from around the globe**
 - Transformed into “Made in Canada” applications
- **Integrates my Government of Canada experience regarding sustainable development initiatives**
 - What works, what doesn't what needs to be improved, what are gaps to be filled
- All initiatives, **presented as options**, allowing stakeholders to cherry pick components, as per their respective preferences

Fossil Demand Flattening Out: New Electrical Generation Capacity

- Two of the largest markets for fossil fuels are the electrical power generation and transportation sectors, the latter nearly 100% dependent on petroleum.
- But since 2013, more than half of the newly added global electrical generation capacity has been associated with the renewables installations
- In China in 2015 nearly 100% of new electrical capacity was renewables, with \$110.5B spent on clean energy and energy efficiency, coal use down 2nd yr in a row
- In the US, in 2015, renewables represented 68% of new electrical generation capacity installed

Fossil Demand Flattening Out: Precipice Shift to Clean Transportation

- China: 2015 During the first 9 months, [136,700 electric vehicles sold](#)
 - 2016, 30% of all Government of China purchases of vehicles are to be electric + similar policies in major regional governments
 - [China's overall clean transportation targets for 2020](#) are to have 1) 5 million eco-vehicles on the road and 2) a capacity to manufacture 2 million eco-vehicles/year
- Norway, 2015, [2015, 25% new car sales were electric vehicles.](#)
- [California](#) target for 1.5M zero emission vehicles (ZEVs) on roads by 2025
 - ZEV innovation and manufacturing; 10% of total State government light duty vehicle purchases in 2015 be ZEVs and 25% by 2025; charging stns for 1M vehicles by 2020; new buildings and parking lots 2 have ev infrastructure
 - [BYD manufacturing plant in Lancaster, California](#) recently signed a contract with the [State of Washington to deliver up to 800 electric buses](#) to that state
- QC has an electric vehicle sector but not comparably supported (Annexes)

Green Economy Gap between Canada and it's Competitors

- Prior to COP21, Canada [rated 56 among 61 nations on a 2016 Global Climate Change Performance Index.](#)
- Canada's share of global clean tech markets is [1.3% and falling](#)
- Clean tech sectors among highest in growth + job creation
 - [6 to 8 times more jobs per government investment unit](#) for investments in the green economy compared with resource economy
 - In 2014, there were [371,000 jobs and 1.2M jobs in the German and EU renewables sectors respectively](#) and [3.5M jobs in EU green sectors](#)
 - China, the world's most aggressive country on the green economy, [had 1.9M jobs in their solar electricity and solar heating/cooling sectors in 2014](#) and [356,000 in their wind sector](#)
- EU and Kyoto: [EU 15 had 8% GHG reduction objective + achieved 11.7%](#)
 - Germany had 21% target [but achieved 24%](#)
- [EU 2020 target 20% reduction but on track for 24%;](#) German [target 40%](#)
- [EU 2030 objective 40% reduction](#)
- Cda vs EU: EU base year 1990, Cda base year 2005 + target 17% for 2030

Fossil Fuel Era Coming to an End: Energy East Redundant

- [BP Chief Economist, Spencer Dale](#); [UBS](#), the world's largest bank; and [Mark Carney](#), Governor of the Bank of England concluded fossil fuel glory era nearing its end
- **This means that much of the world's proven reserves will become stranded assets, or LIABILITIES-80% reserves must remain in ground**
- **Fossil glut (oversupply) will increase over time**
- **Energy East and other pipelines may be redundant**

Financing for the Green Economy: Re-allocations and Diversification

- Re-allocations to high growth/jobs green economy of:
 - [International Monetary Fund](#) 2015 Cdn subsidies \$46B USD
 - **symbolic reductions in fossil subsidies = "greenwashing"**
 - Fossil diversification models: Statoil and Dong Energy
 - Investments can be made **ANYWHERE**– technology not resource driven; doesn't have to be invested in energy, **diversification of manufacturing sector**
- Green Bonds; governments, public and private banks
 - \$100B bonds issued in 2015
 - UK Green Investment Bank, European Investment Bank, community projects bonds, Germany's kfw, Barclay's HSBC

Financing and Manufacturing

- Business Development Bank of Canada (Investissement Québec)
 - Leverage \$2-\$3 for every \$1 invested, like UK GIB
 - Low rate loans +/- or venture capital: Brazil's Banco nacional + Caisse de dépôt
 - Banco nacional 60% to 65% below market rates
 - Canadian content: 50%? (Brazil Banco 56% - 60%) (Hydro-Québec 60%)
 - Revenues: green bonds, sell equity, carbon price, fossil subsidy transfers
- Export Development Canada, Canada Pension Plan Investment Board, carbon revenues, non-compliance with regulations, fiscal + cost sharing
- Clean tech manufacturing support including job training
 - [Sergio Marchionne, CEO Fiat Chrysler, re electric vehicles](#) outsourcing worries
 - Eligibility criteria: GHG reduction: footprint: pollution abatement; Innovation; Private/public investment ratio; Potential for broad + rapid market penetration; supply chain development; Jobs; regions

Research Centres and Montréal: Government and Government Supported

- Role of government: Generic criteria for plurality of technological solutions to optimize innovation/entrepreneurship/participation
 - R & D including foci on bringing down costs of techs
 - Pre-commercialisation demos
 - Venture capital (BDC)
- Research networks of tech-specific research centres, expansion existing + new ones model US (\$6.4B for clean energy in 2015) ,
 - **Identify where Montreal exercises leadership, (electric vehicles, waste to energy, wind techs, energy storage and other gaps not filled in ROC)**
 - Partnerships with private and academic sectors with emphasis on small and medium size businesses and consortiums
 - International partnerships (International Solar Alliance launched by France + India, supported by 120 countries + research support for poor countries eg India's National Institute of Solar Energy)
 - US: <http://energy.gov/eere/office-energy-efficiency-renewable-energy>

National Clean Technology Integration Centre: Montreal Ideal Location

- National Clean Technology Integration Centre to coordinate network of tech-specific centres with view to link multiple sources of clean energy to clean transportation with energy storage, bi-directional ev charging stations and low carbon buildings in between
 - Model: US National Renewable Energy Laboratory: 327 acre campus; 1500 employees; 40 countries on staff
 - Related roles: attract investments from various public and private sources; foster common approaches on R & D, standards and training; enhance technological performance; reduce the technology and financing costs; and support technological transfers to poorer nations
 - **Montreal ideal location 4 universities, INRS, clean energy supply, electric vehicles, energy storage; waste to energy aeronautics precision tech and diversification, wind R&D**

Clean Transportation from Innovation to Manufacturing

- QC clean energy surplus and 42% of greenhouse gases from transportation sector and only area in Canada with critical mass for electric vehicle sector
 - 2 battery manufacturers, 2 charging station manufacturers, TM4 electric motor wheel, e-bus under development, energy storage/super battery
 - 4 universities in Montreal ETS, UdeM, Institut du véhicule Innovant
 - Electric motors and components: primarily outsourcing for original equipment manufacturers
 - Montreal ideal centre for clean transportation research activities
- **Linking Canadian manufacturers (and refiners)** in partnerships with
 - Hydro-Québec; public transit; e-bus (ev?) manufacturing including requirements for e-buses in fleets, private + academic stakeholders,
 - National Clean Technology Integration Centre one-stop-shopping on next level linking clean energy, low carbon buildings, energy storage and micro-grids to clean transportation – include inter-provincial and international collaboration
 - Montreal ideal location for both electric vehicle and Integration Centre
 - Could link with ON auto industry, as appropriate

Vehicle Manufacturers: Reducing Aggregate Fuel Consumption and Accelerating the Availability of Zero and Low Emission Vehicles

- US 300 page legislation: corporate average fuel consumption (CAFE)/category, wheelbase length by track width
 - If sell more large vehicles, overall target less stringent, “compliance flexibility” but overall average in later years more stringent (via mid-term review)
 - Compliance difficult to define
- Cdn remedial action for 2017 to 2025: favour low/zero emission vehicles:
 - Return to the simpler -- prior to 2011 - CAFE model, a model based on aggregates of fuel consumption based on the total sales/manufacturer for a given year, and abandon the footprint (vehicle category) targets
 - More stringent CAFE average of vehicles sold, and independent of US, possibly approaching EU targets
 - Include requirements similar to California and 7 other US states for each manufacturer on minimum percentages of total annual Cdn new vehicle sales that must be zero/low (plug-in hybrid) emission vehicles, 2018-2025

Transportation, Encouraging Market to Favour Low and Zero Emission Vehicles

- Revenue neutral bonus-malus/rebates and surcharges outside of, or within, the federal sales tax system (France bonus up to \$15K, malus up to \$12K)
 - 70 Chinese subsidy programs
- Electric vehicle charging and H2 fueling stations, fed-prov + interprovincial- Cal 1M
- Fed-prov municipal collaboration on building codes: Panel + wiring for electric vehicles, energy storage, building clean energy techs
- Government procurement yearly targets: % zero and low emission vehicles
 - China: 30% vehicle procurement electric as of 2016; California: 10% state procurement of light duty vehicles in 2015, 25% by 2020; CAFE standards for government fleet: option more stringent than for Canadian market at-large
- Government participation in demo projects including those involving other clean techs, micro-grids and National Clean Tech Integration Centre
- Pilot cities programs, Shenzhen targeted to have more [than 3,000 electric taxis, 5,000 hybrids and 1,000 electric urban transit buses](#) on the road in 2015
- Refer to annexes comparing QC, California and China on electric vehicles
- High speed rail from prototype to 2 to 3 demos in dense travel corridors
 - Consortium approach, public/private, Caisse de dépôt, CPPIB, municipal interest

Buildings:

Federal/Provincial/Municipal Collaboration

- Existing buildings (include groups of buildings, condos, industrial parks, etc)
 - Energy audits plus financial packages with payback or leasing arrangements covering micro-grid techs, energy efficiency, + clean energy, energy storage, + clean transportation support infrastructure (note California model)
- New buildings (Canada world LEED leader=% new bldgs)(include research)
 - Modification of building codes with minimum footprint standards (California model: Requirement that new buildings accommodate electric vehicles)
 - Targets: Low and Zero net energy buildings targets (California model zero net energy 2020 and 2030 for residential + commercial buildings respectively)
- New government buildings including government funded buildings
 - Policies consistent with or surpassing government targets, on building codes (energy efficiency, energy independence, clean transportation support)) and LEED objectives for the non-government commercial and residential sectors
 - Participation in some green economy demos and involving research centres
- Audits of existing gov buildings to determine potentials for reducing eco-footprints, followed by prioritization of retrofits

Green Infrastructure

- New government infrastructure policies best to **reverse ratio of traditional economy to green economy investments** to reflect better returns on investments of green economy, climate change and demise of Big Oil business model and could include:
 - Massive investments in public transit with emphasis on electric buses
 - Local clean energy autonomy (includes community energy management, local clean energy micro-grids) , energy and products from waste, non-transit sustainable transportation incentives (high occupancy lanes, bike lanes, car sharing) interprovincial zero emission vehicles charging/fueling stations, interprovincial clean energy grids, innovative road (eg: solar) materials, etc
 - Green cluster hubs (as with aerospace) including complementary sets of stakeholders (supply chain, innovation/R&D, integration techs linking clean energy, low carbon buildings and clean transport, developers with inclusion of **National Clean Tech Integration Centre**, financial institutions) (Technoparc Hubert Reeves)
 - Incubators building space for cross-fertilization of tech solutions

Other Related Initiatives

- Environmental Bill of Rights
 - To put citizens and environmental organizations in driver's seat
 - Could be accompanied with support under Court Challenges Program
- Packaging
 - Provide 2 years for all stakeholders to introduce 100% or near 100% recyclable packaging materials
- Banning Plastic Micro-beads (2.9T microbeads enter US waters annually)
 - Adopt US model banning microbeads from toothpaste and shampoo by July 1, 2017 and beauty products by July 1, 2018
 - Without such a ban in Cda, Cda would become a dumping ground for microbeads
- Plastic Bags (13K pieces of plastic/square km of oceans)
 - Montreal showing leadership banning single use plastics bags and bags that fragment, as of Jan 2018
 - California model: Ban use of single use bags 2015-16; 10 cents for reusable, recycled and compostable bags; Re-usable bags 20% recycled content in 2016, 40% by 2020; Third party certification of reusable bag; Grocery stores required to take back used bags

Concluding Remarks

- Fossil fuel era is drawing to an end, fossil glut on market is not cyclical
 - Electricity markets declining + transportation is next
- Green economy high growth job creation well advanced
- Other countries ahead of Canada on green economy
- Must learn from others and past Canadian experiences
 - No magic bullets for transformative change
- Time for action with large palettes of measures is now
- **Stefan Löfven, PM of Sweden: “History will prove fossil fuel to be a dead end. Sweden will be amongst the first fossil free welfare nations of the world. And eliminating fossil fuel subsidies is an important step on this path.”**
- **CCM and I work together?**