

Charting a Course to Energy Independence

**Providence, RI
August 9-12, 2009**

**Energy Efficiency Improvement Project
at the Embassy of Canada in Washington D.C.**



Department of Foreign Affairs
and International Trade

Ministère des Affaires étrangères
et du Commerce international

Canada





Structure of Presentation

- Government of Canada & Sustainable Development
- Sustainable Development & Real Property
- Approach & Projected Efficiencies & Savings
- Proposed Measures
- Conclusion & Questions

Marc Lalonde

Speaker Name

August 9-12, 2009



Sustainable Development – GoC & DFAIT

- Government of Canada GHG reductions
- Sustainable Development Strategy (SDS)
- Environmental Management System (EMS)
- Other Corporate Policies & Programs
- Office of Greening Government Operations
3 priority areas



Marc Lalonde

Speaker Name

August 9-12, 2009



DFAIT Sustainable Buildings Program

New Buildings – sustainable design guidelines developed and being implemented

Existing Buildings – Major retrofits – Energy Management potential approach

Greening of Long-term Leases

Greening of Fit-up standards

Guidelines to Greening Operations

Establish Key Partnerships within the Green Building Industry

Marc Lalonde

Speaker Name

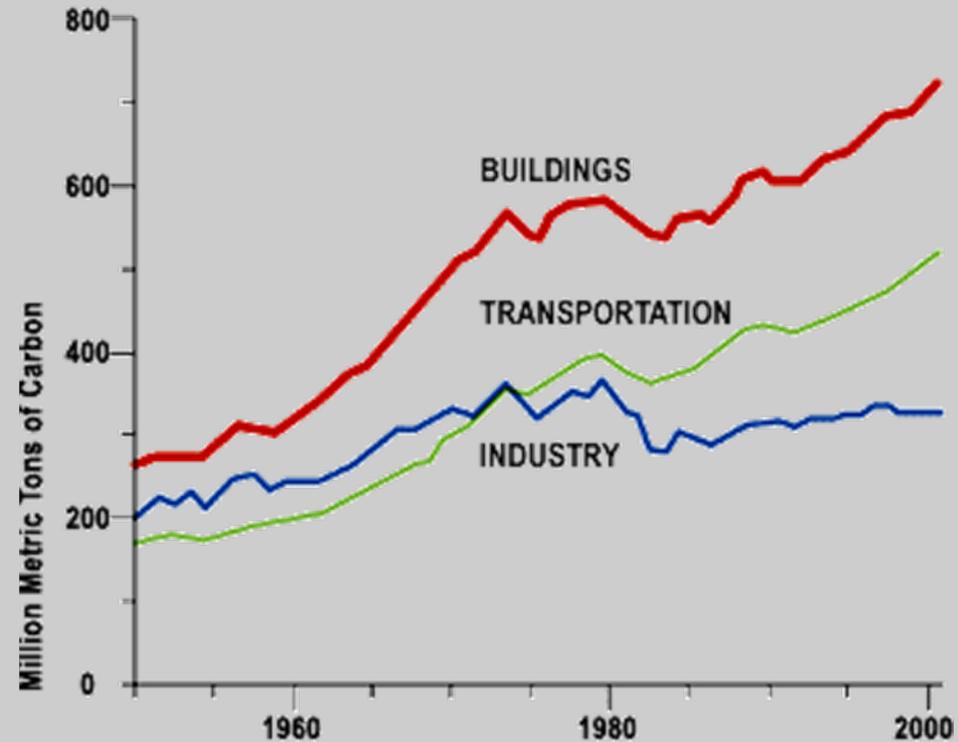
August 9-12, 2009



Why Real Property is Important to SD Issues

Buildings and their operations are responsible for:

- ❑ 40% of GHG emissions
- ❑ 40% of overall energy use
- ❑ 68% of total electricity use
- ❑ 60% of non-industrial waste
- ❑ 20% of water use
- ❑ Indoor Environmental Quality
- ❑ Urban Issues



Marc Lalonde

Speaker Name

August 9-12, 2009



The Growing Importance of Energy

- ❑ Increasing demand exceeding supply, cost increases, availability/reliability and security issues (social & physical)
- ❑ Global trend of energy conservation, race towards alternative energy
- ❑ Importance of Energy Sources as key Environmental Impacts
- ❑ Global trend towards Green Buildings
- ❑ Governments at many levels addressing Energy issues through new Programs & Policies (Conservation & Renewable)
- ❑ UNFCCC CoP 15 in Copenhagen December 2009 pressures to consider building energy as a key priority

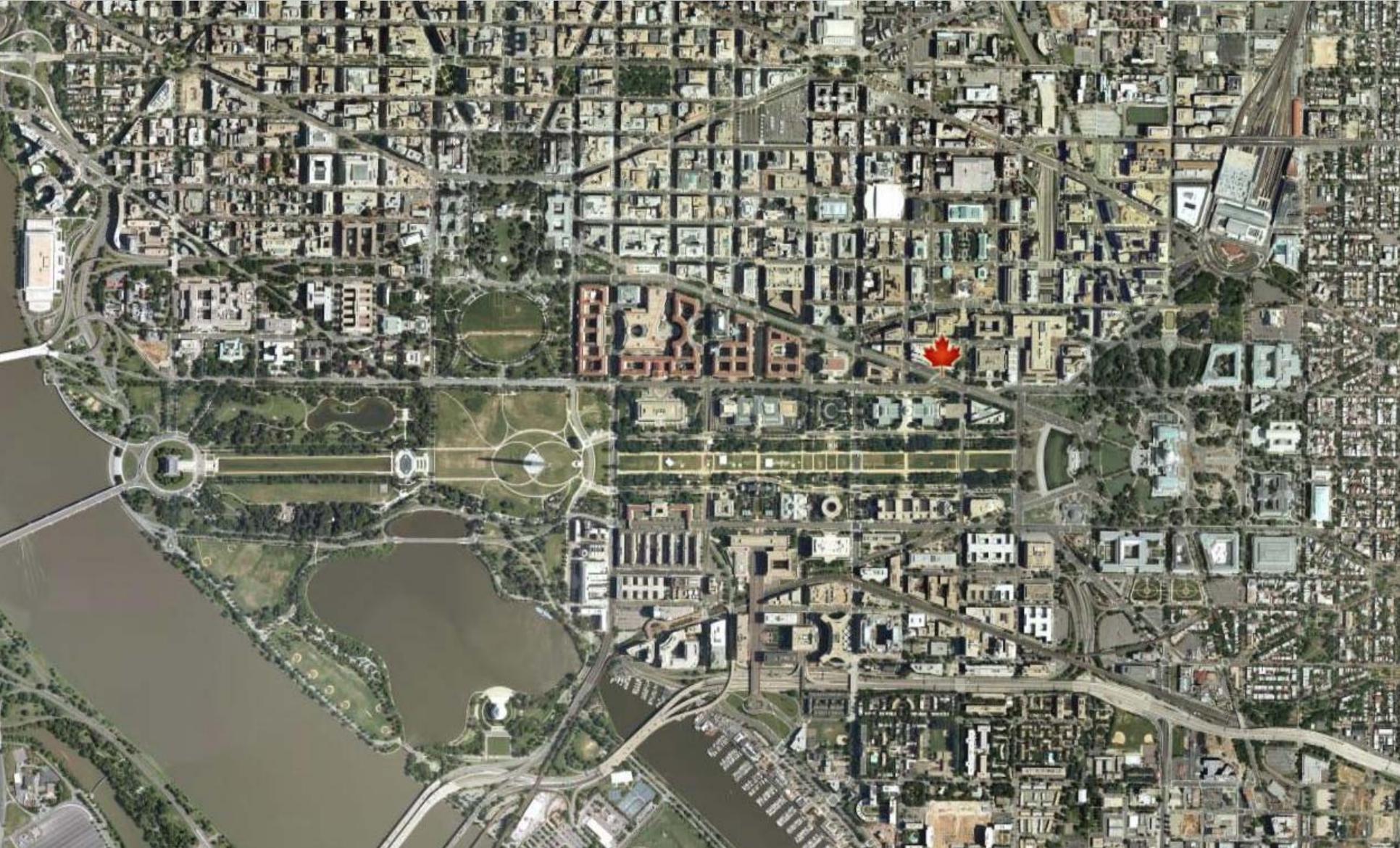
Marc Lalonde

Speaker Name

August 9-12, 2009



Embassy of Canada in Washington D.C.





Embassy of Canada in Washington D.C.

Overall Building: 28,895m² - Constructed in 1988





Embassy of Canada in Washington D.C.

Washington chosen due to its energy consumption and location

Year	2004	2005	2006	2007
Electricity	\$452.7	\$522.6	\$753.3	\$725.3
Gas	\$58.2	\$84.5	\$98.0	\$52.6
Water	\$49.1	\$36.5	\$76.5	\$50.9
Cost in ,000.00	\$560	\$643.6	\$927.8	\$828.8



Marc Lalonde

Speaker Name

August 9-12, 2009



Estimated Efficiencies & Annual Cost Savings

- Overall improved efficiency 37%
- Overall Utility Savings \$319,924
- Reduced Electricity Consumption 1,832,588 kWh (\$243,403)
- Reduced Natural Gas Consumption 47,144 Therms (\$31,058)
- Reduced Water Consumption 1,825m³ (\$17,030)
- Reduced Greenhouse Gas Emissions 249 tonnes CO_{2e}
- Reduced O&M Cost \$20,000





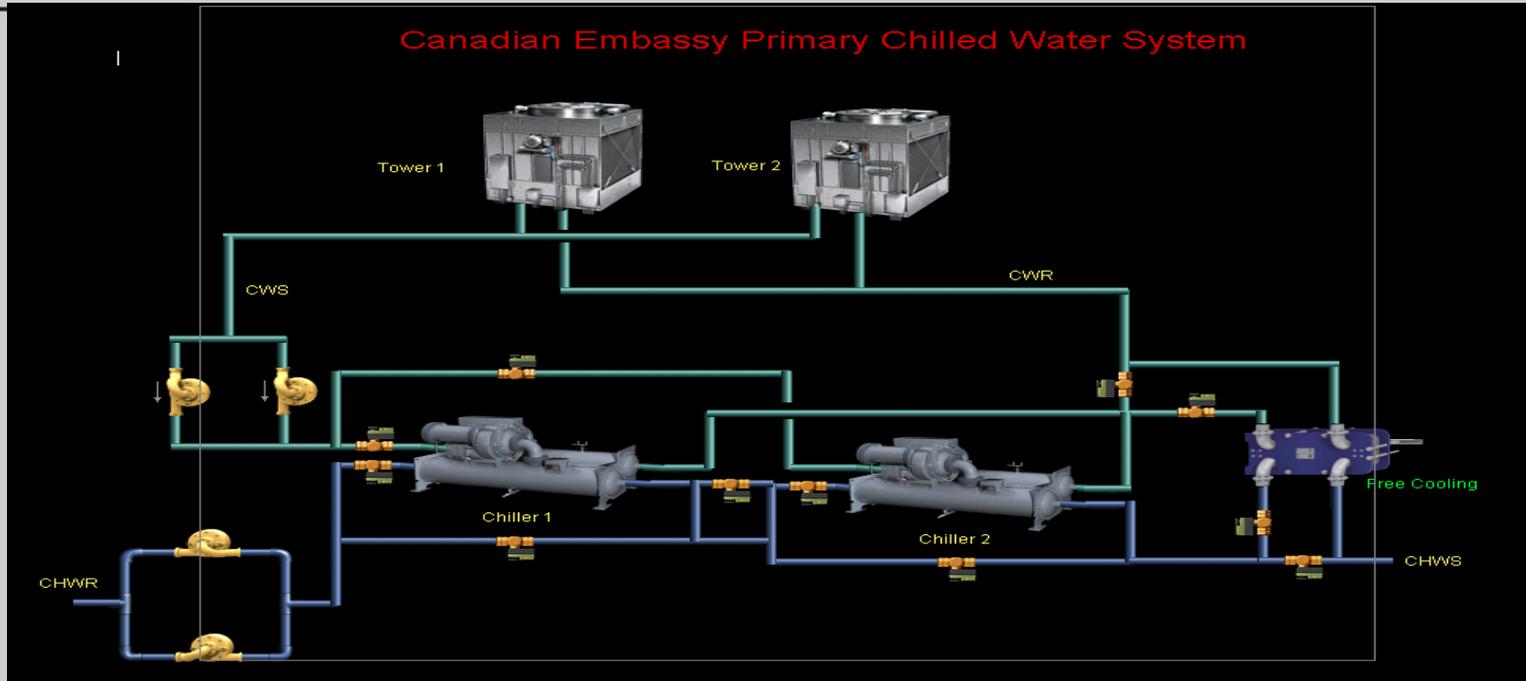
Estimated Costs & Payback

□ Potential Grants	\$20,000
□ Project Cost	\$2,962,893
□ Project Financing	\$994,794
□ Total Project Cost	\$3,957,687
□ Payback Period	10 years
□ Rate of Interest	5.75%
□ Service life of improvements	15-25 years





Chiller Plant Redesign



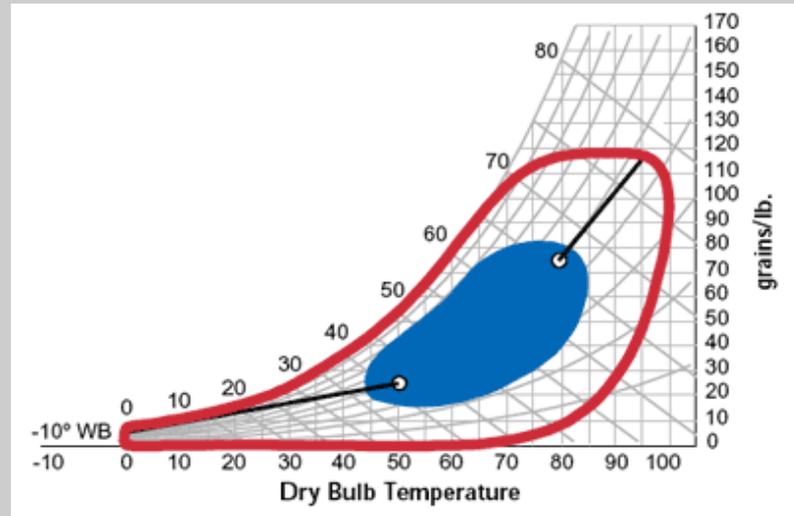
Marc Lalonde

Speaker Name

August 9-12, 2009



Energy Recovery Ventilator



Marc Lalonde

Speaker Name

August 9-12, 2009



Building Automation System

Local Control



Central Cooling Plant



Modem

Operator Workstation



BAS Network



Air Handling Systems



Heating Systems

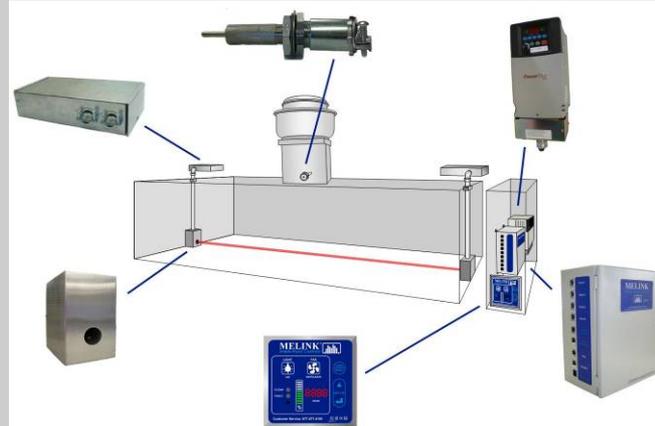
Marc Lalonde

Speaker Name

August 9-12, 2009



Variable Speed Drives



DHW Booster Pumps



Washroom Exhaust

Marc Lalonde

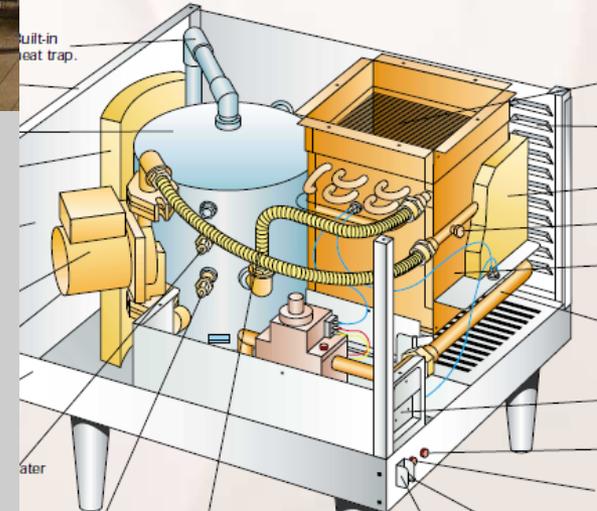


Other Mechanical/Electrical Measures

Electrical Energy Saver Units



Dishwasher Heater Gas Conversion



Marc Lalonde

Speaker Name

August 9-12, 2009



Lighting

- **Next Generation T8 Technology**
 - Longer lamp life
 - Better quality light
 - Occupancy sensor compatible
 - 61 watts to 41 watts for 2-lamp fixture
- **Compact Fluorescent**
 - Replace original incandescent
 - Warm-white colour
- **LED Lighting**
 - Upgrade incandescent sources to LED
 - Soffits, Media Rm, Theatre, traffic light
- **Lighting Controls**
 - Additional occupancy sensors
 - 70 locations (offices, storage, staff room, washrooms, meeting rooms and corridors)





Solar Electricity (photovoltaic)



Marc Lalonde

Speaker Name

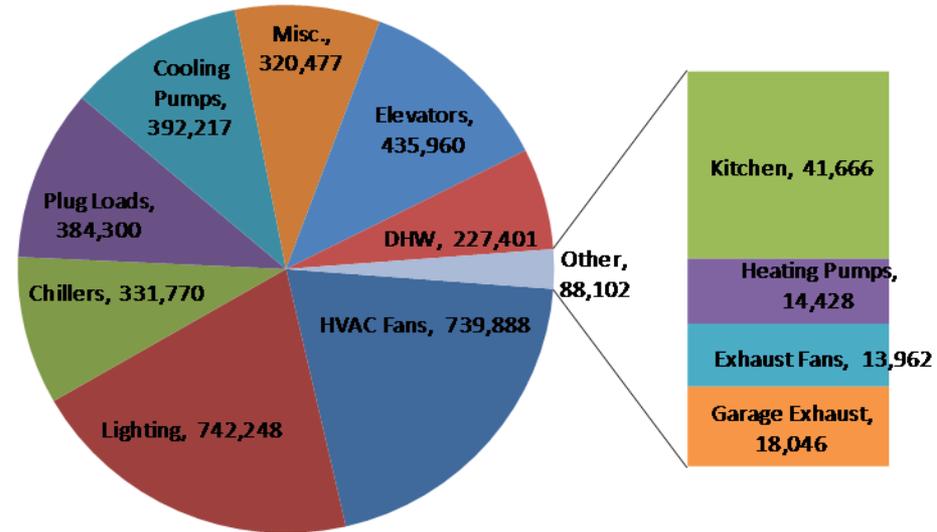
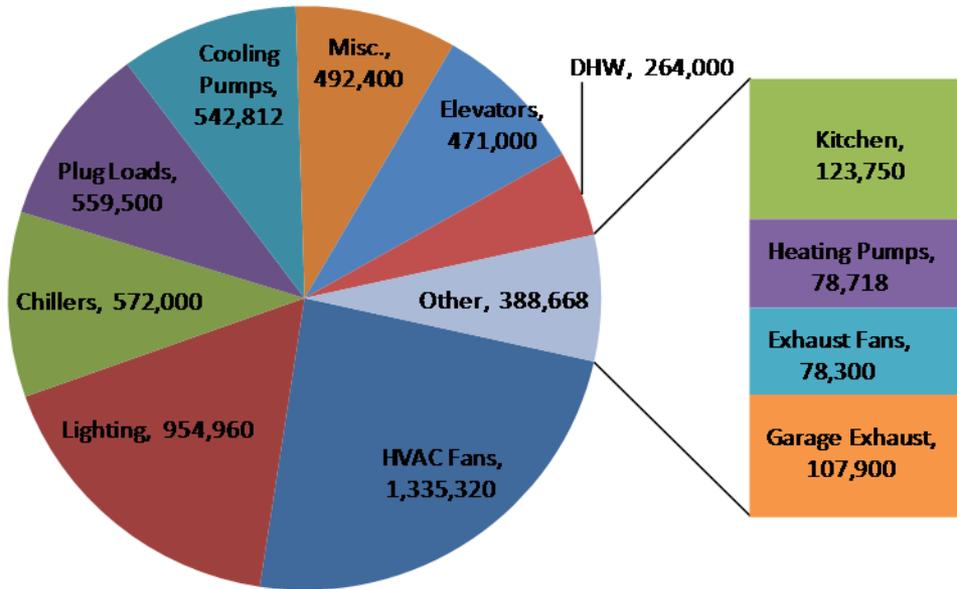
August 9-12, 2009



Performance

Existing Total: 5,581,300 kWh

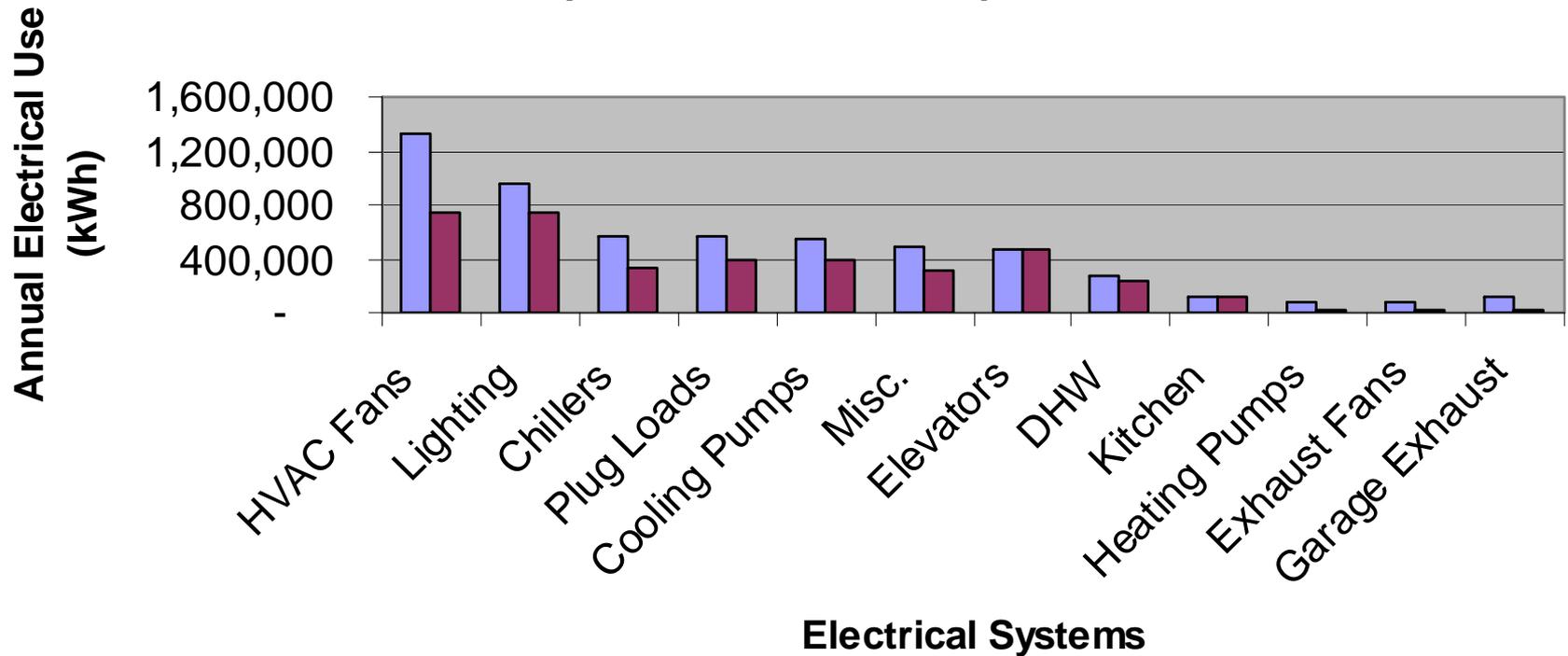
Proposed Total: 3,412,340 kWh





Performance

Electrical Energy Use (before and after)



Marc Lalonde

Speaker Name

August 9-12, 2009



Embassy of Canada in Tokyo, Japan

Chancery Gross Area 27,868.30 m², Negotiated Area 15,735.00 m² Rentable Area 14,052.46 m²

Forecast Utilities

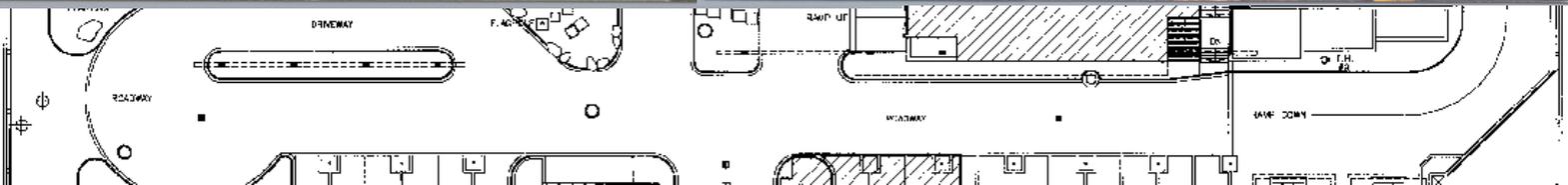
20012-2013
\$1,166,035





Embassy of Canada in Beijing, China

Ch





Questions

Marc Lalonde (ARB)

Sustainable Development Specialist

Sustainable Buildings Program

Physical Resources Bureau (ARD)

Department of Foreign Affairs & International Trade Canada

Marc.Lalonde2@international.gc.ca

819.934.9445

Marc Lalonde

Speaker Name

August 9-12, 2009