

ENERGY PERFORMANCE CONTRACTS

Taking the Risks Out of Energy Efficiency Building Retrofits

LAS Connections
Energy Symposium
December 6, 2012



ENERGY SERVICES
ASSOCIATION
OF CANADA

PROMOTING
PERFORMANCE
BASED SOLUTIONS

TOPICS TO BE COVERED

- Importance of Energy Efficiency
- Background on ESA Canada
- Energy Performance Contracts
- Role of Energy Service Companies
- Benefits of Energy Efficiency Upgrades
- Sample Municipal Projects
- Discussion

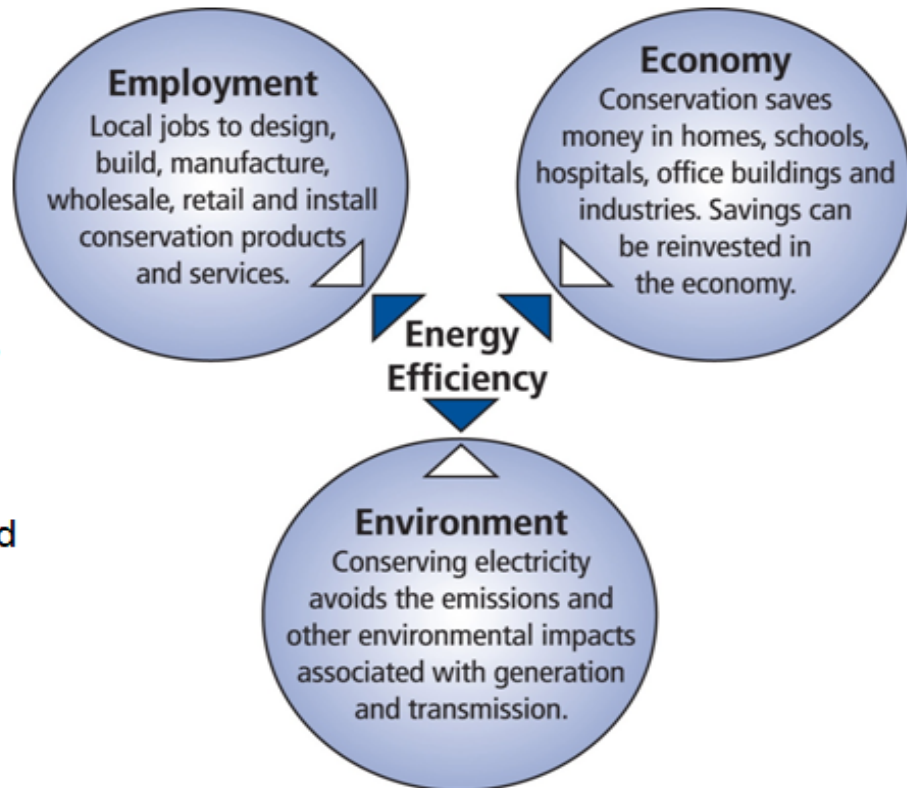


BENEFITS OF ENERGY CONSERVATION

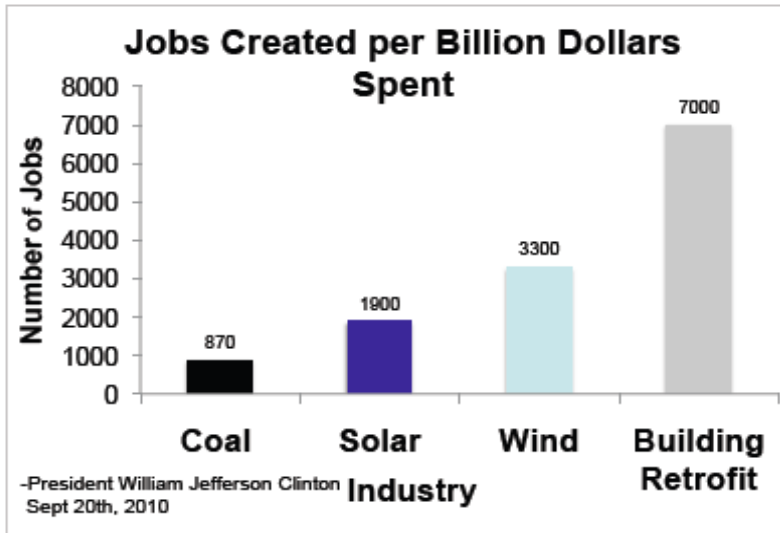
Benefits of Conservation

The Three “Es”:

- **Employment** benefits: labour-intensive, local jobs
- **Economic** benefits: cost-effective for households and makes private sector more competitive
- **Environmental/health** benefits: reduced GHGs, acid rain, smog



EMPLOYMENT BENEFITS



Empire State Building Retrofit:

- 8 month design phase, 60 ideas considered, 8 projects (financial and environmental ROI).
- 3.1 year payback
- Initial \$20 million, 38% energy reduction, \$4.4 million savings annually.
- Creation of hundreds of jobs

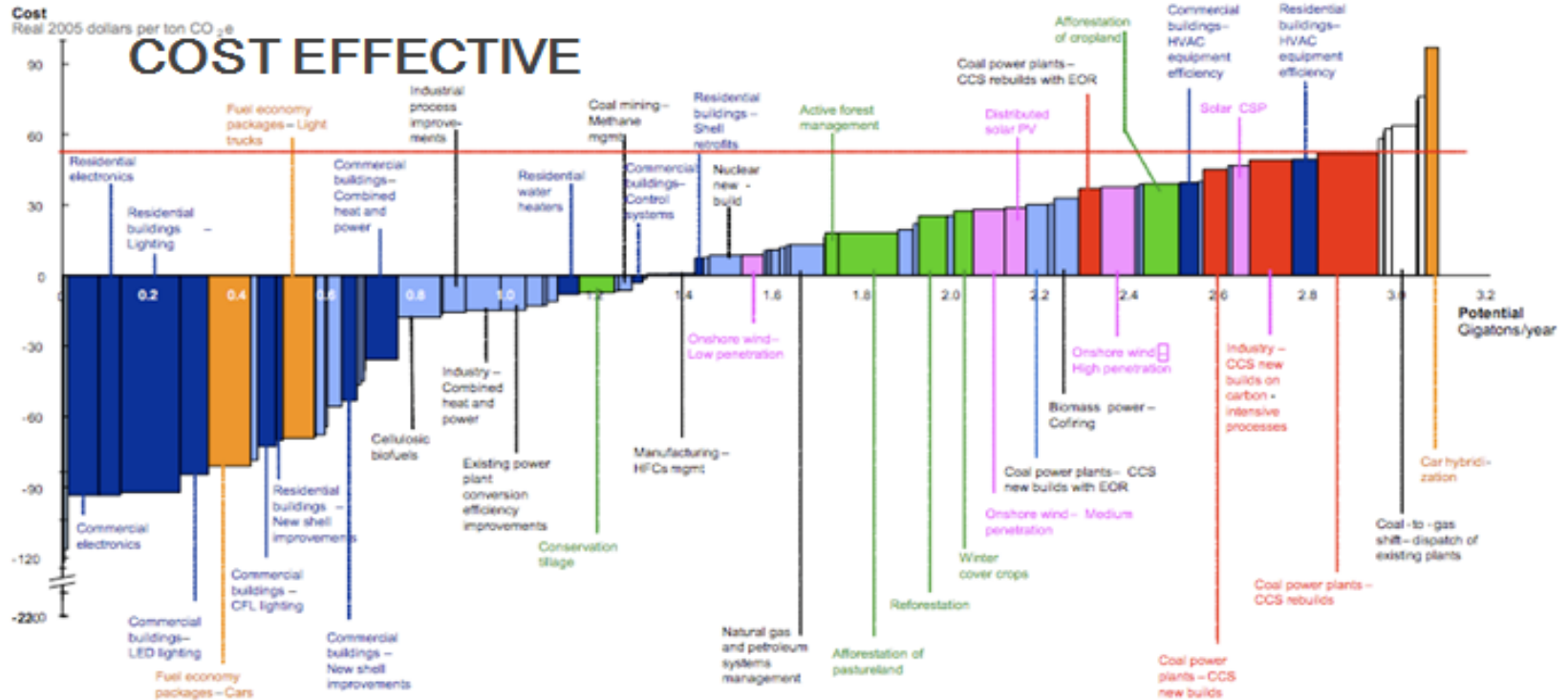
- www.esbnyc.com

ECONOMIC BENEFITS

Example of GHG Abatement Cost Curve



U.S. curve indicates opportunity set in the U.S. is widely distributed (U.S. mid-range abatement curve – 2030)



SOURCE: McKinsey & Co. analysis

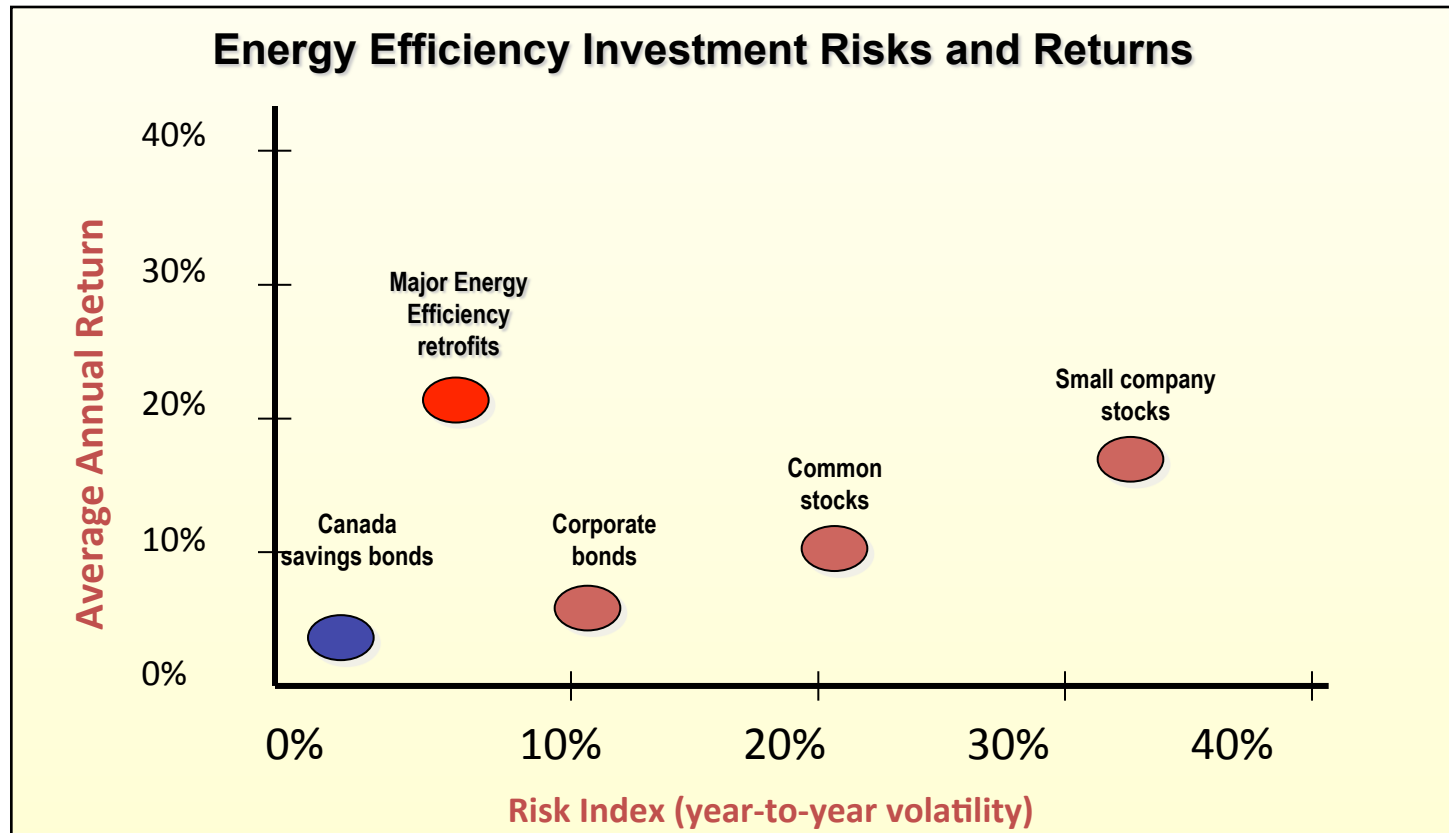
TYPICAL PAYBACK PERIODS

Figure 2: What energy conservation measures (ECMs) are used in a retrofit?

Controls	Payback (yrs.)
Controls retrofits and control strategies	3-4
Demand controlled ventilation	2-5
Mechanical	
Variable flow primary/secondary systems with controls, VFDs	2-4
HVAC	
Constant speed air handlers to variable air volume	2-4
VAV boxes, control setpoints, box flow minimums	5+
Boiler conversions from steam to hot water	5-8
High efficiency fully condensing boilers	6-8
High efficiency VFD chiller system	8-12
Lighting	
Install controls to schedule and interior systems	2-4
Convert incandescent to CFL	1-3
Replace exit signs with LED kits	<2
Convert T12 to high efficiency T8s with electronic ballasts	2-5

Source: Payback source DBCCA and Transcend Equity analysis, 2011. EIA and DOE Building Data Book, 2010; DBCCA Analysis 2011. Paybacks are pre subsidy and reflect a simple return of capital invested without additional return. Payback periods are estimates and there are no assurances that stated payback periods will be achieved.

ENERGY EFFICIENCY RETROFITS ARE GOOD INVESTMENTS



Source: adapted from Ehrardt-Martinez, Karen and John 'Skip' Laitner: « The Size of the U.S. Energy Efficiency Market: Generating a More Complete Picture ». Washington, D.C., American Council for an Energy Efficient Economy, May 2008, page 29.

ENVIRONMENTAL BENEFITS

- IPCC – Most of the observed increase in the globally-average temperature since the mid 20th Century is *very likely* (i.e. > 90% likelihood) due to the observed increase in anthropogenic (i.e. man made) GHG concentrations
- IEA -rising fossil-fuel energy use will lead to irreversible and potentially catastrophic climate change
- Ban Ki-moon - slowing or even reversing the existing trends of global warming is the defining challenge of our ages.
- World Economic Forum's - climate change has the highest combined perceived impact and likelihood
- **82% of Canada's man-made green house gas emissions come from the production and use of energy**

OTHER BENEFITS OF GOING GREEN

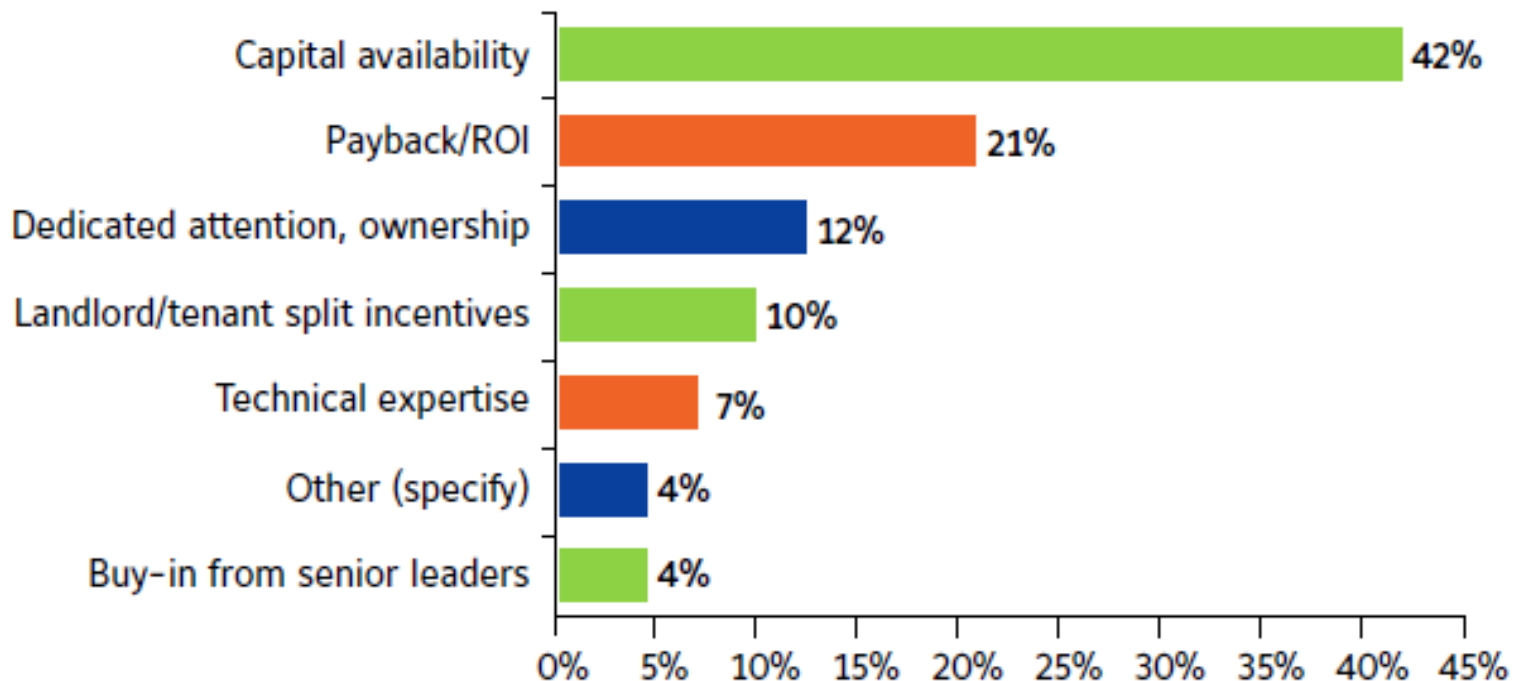
- 93% reported greater ability to attract talent
- 81% saw greater employee retention
- 87% experienced improved workforce productivity
- 75% reported improvement in employee health
- 100% experienced increase in goodwill/brand equity

Source: McGraw Hill “Business Benefits of Green Buildings”.

SIGNIFICANCE OF BARRIERS

Figure 1. Barriers to Energy Efficiency Retrofits

What is the top barrier to capturing potential energy savings for your organization?



Source: Johnson Controls and IFMA (2009) "Energy Efficiency Indicator" survey results.

ENERGY SERVICES ASSOCIATION OF CANADA

- Incorporated August 2010
- 8 founding independent energy service companies



- Represent >90% \$450 million/year market for guaranteed Energy Performance Contracts (EPC)



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WHAT IS AN ENERGY PERFORMANCE CONTRACT

- Involves: a building owner and energy service company (ESCO)
- Savings financing: comprehensive measures with guarantees that the energy savings will be sufficient to finance the cost of the project
- Performance guarantee: Transfers technical and financial risk to ESCO
- Used since mid 80's; Canadian government created Federal Building Initiative in 1992









BENEFITS OF ENERGY PERFORMANCE CONTRACTS

- Turnkey – one contract managing many activities
- Releases pressure on capital funding allocations
- Tried and true approach – used by organizations across Canada since 1993
- **Less expensive than alternatives when all staff/management costs included**



EPC LESS EXPENSIVE THAN TRADITIONAL PROCESS

EPC Procurement	Traditional "Piecemeal" Procurement
 Performance Guarantee Fee  Financing Charges	 Additional Procurement Processes  Additional Human Resources  Opportunity costs for differed projects  Less Energy Savings resulting from: <ul style="list-style-type: none">• Lost time• Fragmented Approach• No Monitoring and Verification• No Savings Guarantee



ROLE OF ESCOs

- Think of an ESCO as an extension of building owners/operators resources
 - Carries out feasibility studies / energy audits
 - Puts together a plan of action –design, implementation plan, purchase, installation, commissioning and measurement/verification of savings. Let's not forget training and awareness.
 - Arranges for financing
 - Reports to facility manager on an on-going basis



ADDRESSING DEFERRED MAINTENANCE

- Projects or facilities can be bundled to increase scope and energy savings
- Guaranteed energy savings from EPC can also be used to fund non-energy deferred maintenance priorities
- Typically achieved by extending the term of the EPC contract



CANADIAN CASE STUDIES

- 37 Case Studies of successful projects on ESAC's web site
 - 2 federal buildings
 - 4 DND bases
 - 6 provincial/municipal buildings
 - 14 universities/colleges/school boards
 - 7 hospitals
 - 4 commercial/industrial



MUNICIPAL CASE STUDIES

- Town of Newmarket
- City of London
- Town of Orangeville
- City of Timmins
- City of Toronto
- City of Windsor

TOWN OF NEWMARKET



- \$1.5M Energy and Facility Renewal Program including 9 facilities
- Self-funded program that guaranteed annual savings of more than \$157,000 over nine years
- Resulted in reduced electrical, natural gas and water consumption

CITY OF LONDON



- \$2.3 million project included retrofit of 19 city buildings
- Included 8.5kW solar pv system
- Greenhouse gas savings equivalent of taking 3,500 cars off the road

TOWN OF ORANGEVILLE



- \$1.2 million project for 7 facilities
- Guaranteed savings of \$176,000/year – 7 year payback
- Measurement & Verification found project performing above expectations

CITY OF TIMMINS



- \$3.7 million project covered 59 facilities (office space to processes) with no disruption to users
- One of largest opportunities was variable pumps in water treatment facilities
- \$460,000 annual savings, 7 year payback

CITY OF TORONTO



- Project included retrofit of 8 solid waste transfer facilities
- Guaranteed 8 year pay back
- Improved occupant comfort as well as reduced operating costs

CITY OF WINDSOR



- \$3.6 million project upgrading 48 facilities
- \$386,000 projected annual savings
- Actual savings (\$665,000/yr) outperformed by average of 55% across all 4 phases

DISCUSSION

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