



ONTARIO POWER AUTHORITY



May 27, 2008

# Presentation of Results: Emerging Energy Conservation Technologies and Practices Scan

# Welcome

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- Thank-you for attending our web conference on Emerging Energy Conservation Technologies and Practices

## Agenda

1. Introduction – Phil Bosco, OPA
2. Presentation of Results – SeeLine Group Ltd
3. Q & A

## **Purpose**

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- To inform the short-term investment strategy of the Technology Development Fund, inform the market transformation strategy currently in development, and provide guidance for the OPA's future conservation program delivery.
- The focus of the Survey is to develop a list of the top 20 technologies for the residential, commercial/institutional, and industrial sectors.
- This project was supported by contributions from BC Hydro, Ontario Ministry of Energy, Enbridge Gas Distribution, and Union Gas.

## Collaboration

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- This scan was a first step for the OPA to foster a coordinated collaborative relationship with other emerging technology funders in Canada.
- This initiative has already resulted in fruitful discussions with our partners at CEATI, the Canadian DSM Alliance and the Ontario Centres of Excellence.
- Through continued collaboration we hope to advance our technology development and market transformation efforts by achieving a substantial and sustainable increase in the market share of energy efficient technologies and applications.



# EMERGENT ENERGY CONSERVATION TECHNOLOGY STUDY

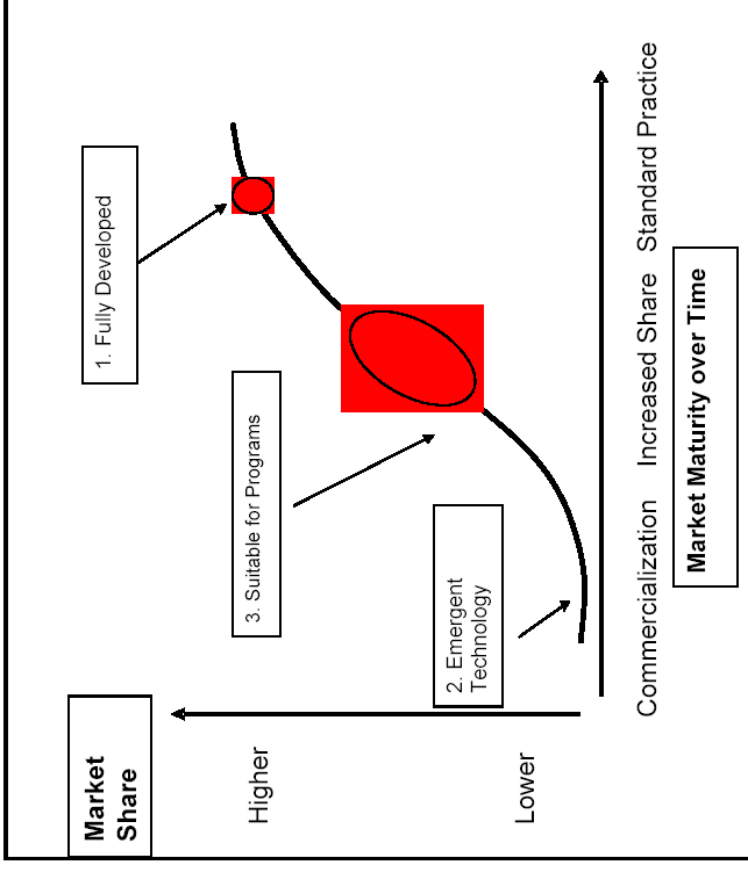
A study of new and emerging technologies  
undertaken by SeeLine Group Ltd for the Ontario  
Power Authority



**Scope:** Review a series of new and emergent technologies and practices that might be brought more quickly into the Ontario marketplace through an investment by the Technology Fund or by incorporating them into a CDM program

**Technology relevance:**

3 categories were developed, representing where the technology resides on a typical technology market realization curve (i.e. an 'S' curve)



1. Fully developed and well represented in the market - not relevant for either Technology Development or Programs, except for specific purposes,
2. Emergent technology, still in the development phase or pre-commercial, suitable for the Technology Development Fund,
3. Fully developed, has not achieved any significant market penetration, suitable for Programs.

- **Approach**
  - Developed an Excel based Technology Screening Tool
  - Developed 10 criteria under which the technologies were assessed:
    - >6 technical criteria, including potential impact, time to market, price etc
    - >5 market criteria reflecting risk, barriers, size and infrastructure
- **Each technology was given a score from 1 to 5 under each of the criteria**



- **Approach**
  - Developed 5 non-scoring criteria for sorting and prioritizing to suit client requirements:
    - Technology Relevance
    - GHG reduction potential
    - Natural gas relevance
    - Ontario Utilization context
    - B.C. Utilization context
    - Made in Canada context

- **Approach**
  - More than 150 technologies were reviewed, sifted through the Screening Tool and ranked
  - A wide variety of source documents were used, originally provided as part of the RFP and then expanded based upon the knowledge and experience of the project team

- **Approach**
  - Once the list of top 20 was developed, each technology was subjected to a more detailed examination:
    - Description
    - Energy Savings and Costs
    - Market Barriers and next steps



# Results

## Emerging Technologies – all sectors

Number	Sector	Measures Group	Technology Name	Total Evaluation
1	Comm	Lighting	Electronic HID ballasts	36.8
2	Ind	Utilities	SolarWall PV/T	30.0
3	Comm	Energy Monitoring	Real-time building performance software	29.6
4	Res	HVAC	Zoned HVAC system with high-pressure duct	29.0
5	Comm	Lighting	Integrated ambient task lighting systems	28.4
6	Comm	Lighting	Advanced HID lamps	27.6
7	Comm	Lighting	IC based controls for ballasts	27.2
8	Comm	Load Management	Individual End-User Smart Feedback	26.8
9	Res	Envelope	High quality envelope insulation	26.2
10	Res	Energy	Solar PV - grid connected	26.2
11	Res	Appliances	Solid state refrigerators (Cool Chips)	26.0
12	Comm	Lighting	Multi photon phosphors	25.2
13	Comm	Envelope	Next generation fenestration components	25.0
14	Comm	Energy Supply	Building-integrated renewable energy system	24.4
15	Ind	Utilities	Solar PV	24.2
16	Comm	Service & Maintenance	Next generation operator controls	24.2
17	Ind	Utilities	Fuel cells	24.0
18	Res	HVAC	Integrated home comfort systems	24.0
19	Comm	HVAC	Individual occupancy controls	23.6
20	Res	Appliances	1-Watt standby power for home appliances	23.6



## Emergent Residential sector technologies

Number	Measure Group	Technology Name	Total Evaluation	Natural Gas Relevance	GHG Reduction	Ontario Utilization	BC Utilization	Made in Canada Context
1	HVAC	Zoned HVAC system with high-pressure distribution	29.0	3	2	3	3	3
2	Envelope	High quality envelope insulation	26.2	2	3	3	3	3
3	Energy	Solar PV - grid connected	26.2	1	2	3	3	2
4	Appliances	Solid state refrigerators (Cool Chips)	26.0	1	2	3	3	1
5	HVAC	Integrated home comfort systems	24.0	2	2	3	2	3
6	Appliances	1-Watt standby power for home appliances	23.6	1	2	3	3	2
7	HVAC	Advanced unitary HVAC compressors	22.6	1	3	3	2	1
8	Lighting	LED lighting	20.4	1	1	3	3	1
9	HVAC	Residential gas absorption chiller heat pumps	18.0	2	1	2	1	1
10	Energy	Micro-generation using Stirling engines	16.0	3	3	3	3	3
11	HVAC	CHP using fuel cells	15.0	3	3	3	3	3
12	HVAC	Advanced cold-climate frostless heat pumps	14.2	1	1	2	2	1
13	Lighting	Universal dimming control	9.2	1	1	1	1	1



## Emergent Commercial Sector Technologies

Number	Measures Group	Technology Name	Total Evaluation	Natural Gas Relevance	GHG Reduction	Ontario Utilization	BC Utilization in Context	Made in Canada
1	Lighting	Electronic HID ballasts	36.8	1	3	3	3	2
2	Energy Monitoring	Real-time building performance software	29.6	2	3	3	3	2
3	Lighting	Integrated ambient task lighting systems	28.4	1	3	3	3	1
4	Lighting	Advanced HID lamps	27.6	1	3	3	3	1
5	Lighting	IC based controls for ballasts	27.2	1	3	3	3	1
6	Load Management	Individual End-User Smart Feedback	26.8	1	1	3	3	3
7	Lighting	Multi photon phosphors	25.2	1	2	3	3	1
8	Envelope	Next generation fenestration components	25.0	2	2	3	2	2
9	Energy Supply	Building-integrated renewable energy systems	24.4	1	3	3	3	2
10	Service&Maint.	Next generation operator controls	24.2	2	2	3	3	3
11	HVAC	Individual occupancy controls	23.6	3	2	3	3	2
12	Service&Maint.	Advanced automated and portable diagnostic tools	23.0	2	2	3	3	2
13	HVAC	High efficiency Gas-Fired absorption chiller	22.8	2	2	3	2	1
14	Load Management	Renewable energy-powered electronic devices	21.2	2	3	3	3	2
15	Design Tools	Advanced integrated design software	20.6	3	3	3	3	2
16	Commissioning	Retrocommissioning software	20.0	2	3	3	3	3
17	HVAC	Next generation thermal cool storage systems	19.8	1	1	2	2	1
18	HVAC	Integrated Liquid-Desiccant/Vapor-Compressor AC	19.8	2	2	2	2	2
19	Refrigeration	Next generation refrigerants	19.8	1	2	3	3	2
20	Lighting	Hybrid solar lighting	19.2	1	1	1	1	1
21	Envelope	Dynamic envelope components and integrated systems	18.2	2	2	3	3	1
22	HVAC	Next generation HVAC heat exchangers	16.8	1	2	3	2	1
23	HVAC	Solar-powered absorption/adsorption (liquid-desiccant) chiller	16.4	1	1	2	2	1
24	Lighting	Universal dimming control	16.4	1	3	2	2	1
25	Lighting	LED lighting for hospitality applications	15.6	1	1	2	2	1
26	HVAC	Advanced cooling cycles	15.0	1	2	3	2	1
27	Envelope	Active window insulation	14.0	3	2	3	3	2
28	Lighting	LED lighting for street lighting applications	11.6	1	2	2	2	1
29	Lighting	LED lighting for Hibay applications	10.4	1	2	2	2	1
30	Lighting	LED lighting for office area lighting applications	10.4	1	2	2	2	1
31	Lighting	Scotopic lighting	8.0	1	1	1	1	1



## Emergent Industrial Sector Technologies

Number	Measures Group	Technology Name	Total Evaluation	Gas Relevance	Reduction Potential	Utilization Context	BC Utilization Context	in Canada
1	Lighting	Electronic HID ballasts	34.0	1	3	3	3	2
2	Utilities	SolarWall PV/T	30.0	2	3	3	3	3
3	Lighting	Integrated ambient task lighting system	28.8	1	3	3	3	1
4	Lighting	IC based controls for ballasts	28.4	1	3	3	3	1
5	Lighting	Multi photon phosphors	25.2	1	3	3	3	1
6	Utilities	Solar PV	24.2	1	3	3	3	2
7	Utilities	Fuel cells	24.0	2	3	3	2	3
8	Lighting	Universal dimming control	22.4	1	1	3	3	1
9	Other	Membrane technology wastewater	20.8	1	1	3	2	3
10	Utilities	Nanotechnology based lithium-ion batte	20.2	1	3	3	2	1
11	Utilities	Solar thermal	19.4	3	3	3	3	3
12	Lighting	Advanced HID lamps	19.2	1	3	3	3	1
13	Lighting	Hybrid solar lighting	19.2	1	1	2	2	1
14	Food	Membrane technology - food	15.8	1	1	2	2	1
15	Lighting	Scotopic lighting	15.2	1	1	1	1	1
16	Lighting	LED lighting for Hibay applications	8.0	1	1	1	1	1

- **Key findings – Themes**
  - Many lighting opportunities
  - Cross-sectoral industrial technologies are very significant
  - Controls – end user and technology
  - Renewable energy – particularly solar
  - Integration, systems approach

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# Questions ?

## Closing

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Thank-you for joining us today.

Your feedback is always appreciated. Comments can be sent via-email to [techfund@powerauthority.on.ca](mailto:techfund@powerauthority.on.ca)

The presentation, the report, and appendices will be posted on the Technology Development Fund website by the end of the week.

[www.powerauthority.on.ca/tdfund](http://www.powerauthority.on.ca/tdfund)