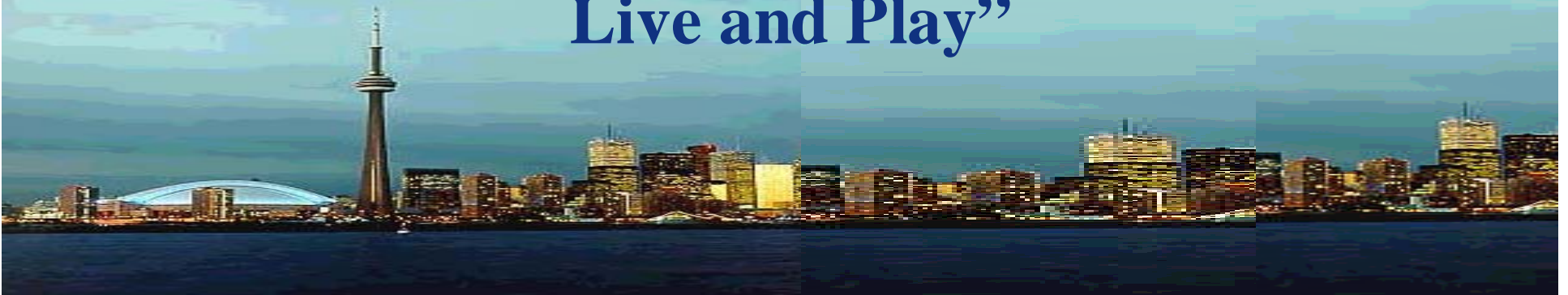


# **TORONTO HYDRO ENERGY SERVICES**

## **Street Lighting Division**

**“Lighting the Way Where We Work,  
Live and Play”**





# Toronto Hydro Corporate Structure

Toronto Hydro Corporation (THC)

Toronto Hydro Electric System Ltd. (THESL)

Toronto Hydro Energy Services Inc.(THESI)

Generation

Energy Management Services

Street Lighting



# Creation of Toronto Hydro Street Lighting Inc.

## OEB Compliance

- Street Lighting work determined to be competitive by Ontario Energy Board (OEB)
- Creation of unregulated affiliate within Toronto Hydro Corporation
- No subsidization from affiliates
- Physical and resource separation
- Service Level Agreements between affiliates included
  - Fleet
  - Procurement
  - Facilities
  - Shared Services



# Street Lighting History

- Street Lighting Assets were constructed, owned and operated by Local Distribution Companies (LDC)
- Street Lighting assets transferred to the municipalities in the late 80's
- Street Lighting work defined as competitive by OEB in 2000
- Street Lighting company created in 2001
- Toronto Hydro Corporation (THC) proposes purchase of Street Lighting assets from City of Toronto
- THC purchase Street Lighting assets from City of Toronto January 1, 2006



# Street Lighting Mission Statement

*“To provide efficient, reliable, timely service to our Street Lighting customers in Toronto. Maintain & Upgrade our system is our #1 priority. First and foremost we will accomplish these goals by using our golden rule”*

***“Our Safety is 24/7”***

**No “Loss Time” Accidents  
for  
6 Years**



# The Street Lighting Asset

- 160,000 street lighting fixtures and 50,000 poles.
- Total load of 27 MW
- 40,000 Metal Halide (City Core), 120,000 High Pressure Sodium
- 500 Expressway lighting fixtures including High Mast
  - Don Valley Parkway, Gardiner & Allen Expressways, and HWY 27
- Underground ducts and cable infrastructure and Overhead conductors
- Last major conversion of the lighting asset took place in 1993, Incandescent to HPS and MH
- Age of the street lighting system requires an Asset Centric Management Model approach



## Why ALAMP?

- Requirement to transition Street Lighting assets into Toronto Hydro asset centric model
- Requirement to test new energy efficient light source technologies
  - Separate marketing from actual performance
  - Urban legend de-mystifying (light sources)
- Realization that assets purchased were meeting end of life and require replacement
- Growth in public interest with regards to roadway lighting from a safety and energy conservation perspective
- Reduction of operating expenses by reducing maintenance expenses



# ALAMP – (Adaptive Lighting Asset Management Program)

## Objective

The goal of ALAMP is to develop an holistic street lighting system utilizing new Street Lighting technologies that meet the following criteria:

- RP8 and Light Pollution Policy Compliance
- Energy Efficiencies/Conservation
- Operational Efficiencies
- Monitoring/Diagnostic Capabilities
- Public Safety and Perception
- Aesthetics and Colour Rendition



# ALAMP Phase I Light Source Selection Criteria

The following criteria was requested from manufacturers for inclusion in the Phase I testing at Wiltshire Yard:

- Light Sources Tested
  - LED, Induction, Electronic Ballast, T5 Fluorescent, Core and Coil (Base Case)
- Light Fixture photometrics – in IES format
- UL and CSA Approval
- 100 Watt Metal Halide Equivalent
- Driver/Ballast, Light Source, System specifications
- Distribution/Supply Chain



## The Guiding Principals of ALAMP

The new technology shall :

- Maintain or improve the safety and security of the people of the City of Toronto and Toronto Hydro employees.
- Be the most energy efficient and proven lighting technology for use on the City of Toronto road and expressways.
- Maintain recognized North American lighting design standards and recommended practices, such as the Illuminating Engineering Society of North America's guidelines for Roadway Lighting and for control of exterior light pollution and lighting trespass.
- Contribute to reduction of operating and maintenance costs.



## ALAMP PHASE I

- Extensive testing of the white light sources was performed during a nine month period
- Comparative data that was tabulated and collected included illuminance, temperature, and power consumption.
- The fixture's Photometric files were used to determine RP-8-00 compliance on 2 common roadways
- The data collected supports further testing of Metal Halide lamps with electronic ballast, Induction and T5HO fluorescent sources.
- LED light sources will be tested in Underpass or Pathway lighting



# Summary of Findings

LIGHT SOURCE	RP-8-00 MAJOR ROAD	RP-8-00 LOCAL ROAD	PURCHASE COST HIGH MED/LOW	MTCE COST	PHASE 2	ENERGY SAVINGS
LED	FAIL	FAIL	HIGH	HIGH	Limited	TBD
INDUCTION	FAIL	PASS	MED	LOW	YES	25%
METL HAL/EB	FAIL	PASS	MED	LOW	YES	25%
T5HO	FAIL	PASS	LOW	LOW	YES	25%



## Recent Advancements LED in ALAMP Phase II

- LED Photometrics suggest RP-8-00 compliant on local roadway
- Efficacy reaches required Lumens/Watt slightly exceeds conventional light sources
- Ability to create Type II and III light pattern and improved Uniformity
- Heat sink issues appear to be managed
- Phase II Pilot Test will now include LED



## ALAMP Phase II

### Phase II Process

- Establish timelines for Phase II
- Develop Test Protocol
- Identify the Test Sites (ten)
- Develop a Business Case product specific
- Produce and document technical information
- Calculate Environmental Impact
- Develop a Communication Protocol
- Produce Phase II report with recommendations



## ALAMP Phase I B The Iterative Approach

- LED manufacturers will be encouraged to submit products for testing
- Test Criteria will remain consistent with Phase I A
- Non Disclosure Agreements protect both Parties
- Results shared exclusively with participants through face to face meetings
- Positive results may result in Phase II participation



## Command and Control Dimming & Asset Management

- Ideal solution to combine new technology energy reductions with IESNA RP-8-00 opportunities
- The last bit of “juice in the orange”
- Only available if there is capacity or over engineered
- Offers Asset Management/Service Response
- Network Operations Centre (NOC)
- Strategic implementation (Crosswalks, Intersections)
- Business Case required to justify incremental cost



# Q & A

