

# HYDRO ONE VEGETATION MANAGEMENT STUDY 2016

CN UTILITY CONSULTING  
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# HYDRO ONE VEGETATION MANAGEMENT STUDY 2016 – PURPOSE AND OBJECTIVES

**The Ontario Energy Board (OEB) directed Hydro One to perform:**

- *A comprehensive trend analysis of the vegetation management program showing year over year comparisons in unit costs*
- *A best practices study . . . for vegetation management similar to the CN Utility study filed in EB-2009-0096* (OEB, March 2015, p. 61)

## **CN Utility Consulting's Response:**

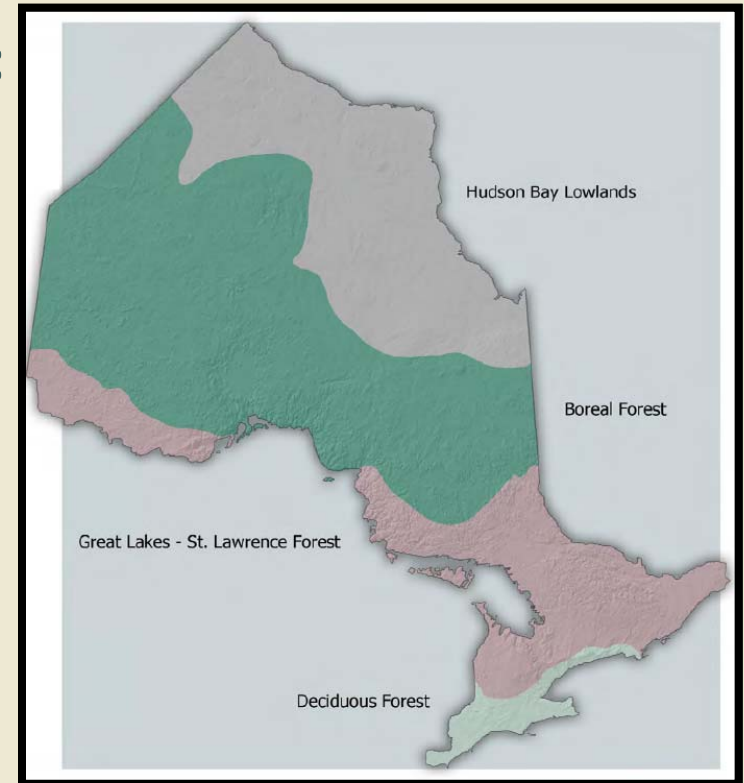
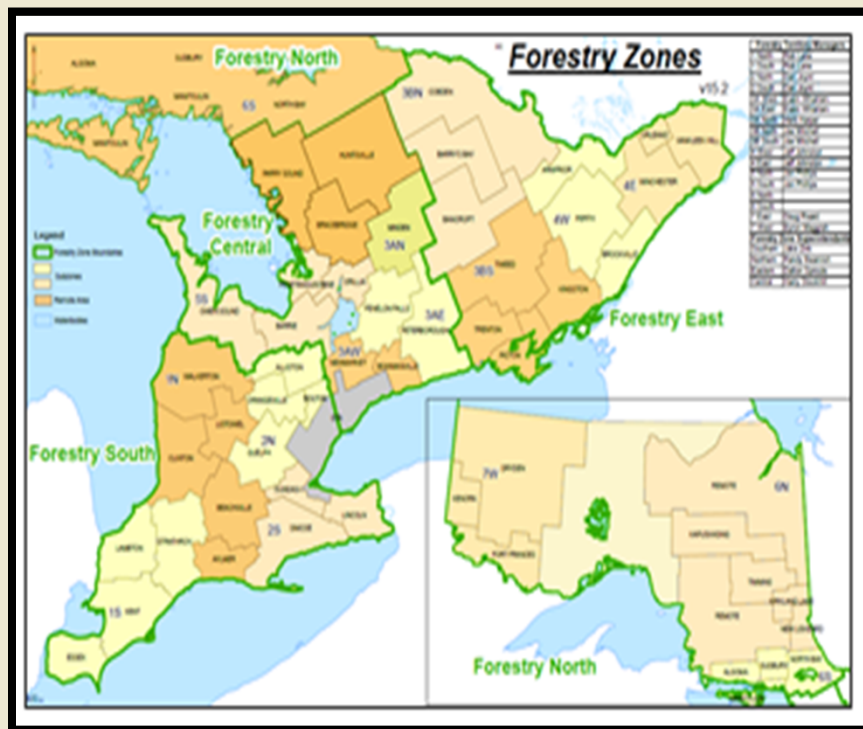
- Measure the performance of Hydro One's Utility Vegetation Management (UVM) program in relation to comparable North American utilities and determine relative efficiency
- Perform year-over-year (longitudinal) analysis
- Develop a list of best management practices for UVM
- Provide recommendations and innovative opportunities



# Hydro One's Utility Vegetation Management (UVM) Setting

## Important UVM Setting Considerations:

- **WORKLOAD:** 7.7 million trees
- **KILOMETRES OF OVERHEAD LINES:** 102,000 km
- **CUSTOMER BASE:** 1.3 million customers
- **FOREST VARIATIONS:** Three main forestry regions



- **CUSTOMER DENSITY:** Mostly rural and remote
- **CLIMATE CHALLENGES:** Harsh, long winters, many ice and wind events



# UVM Industry Objectives

- Reliability
- Safety
- Compliance
- Cost-effective
- Customer Service
- Fire Prevention
- Sustainable Environmental Quality

# UVM Best Management Practices (BMP)

## *Best Management Practice for Sustainable UVM*

Perform consistent, compliant, and cost-effective ROW corridor management to ensure reliable electric service, environmental quality, customer satisfaction, and safety for workers and the public

### **Industry UVM BMP Strategies:**

- Provide sufficient funding and resources
- Build a safe ROW environment through education and program features
- Define, measure, and audit space between powerlines and trees
- Maintain clearances between conductors and vegetation using industry-approved practices targeted
- Establish flexible, variable cycles of inspection and maintenance to achieve objectives
- Promote sustainable ROW habitats through use of herbicides and plantings





## Peer Selection

- **Peer Selection Criteria in Order of Importance**

- ☐ Peer participant in 2009 study
- ☐ Geographic location and proximity to Hydro One's territory
- ☐ Tree density and managed tree characteristics
- ☐ Customer density determined by:

- **Comparators**

36 industry comparators → 27 utilities chosen as peers



## Key Findings

### Hydro One Strengths Identified in the 2009 UVM Study continue in 2011-2015

- Superior productivity over a majority of peer utilities
- Higher level of worker experience and length of tenure
- Worker turnover rates are one of the lowest in UVM industry
- Clears 100% of ROW





## Key Findings

# Hydro One is on Track to Improve Performance

- UVM Unit Costs
- System reliability as measured by IEEE-reliability metrics
- Vegetation Management of M-Class Feeders





## Key Findings

# Hydro One's Progress is Complicated by Challenging Factors

- Long cycle lengths
- Low customer density and high tree density
- Fixed costs relative to union agreements and in-house personnel and administration
- Increasing public resistance to vegetation management practices
- Higher expectations for reliability improvements
- Off-ROW trees that cause the majority of outages

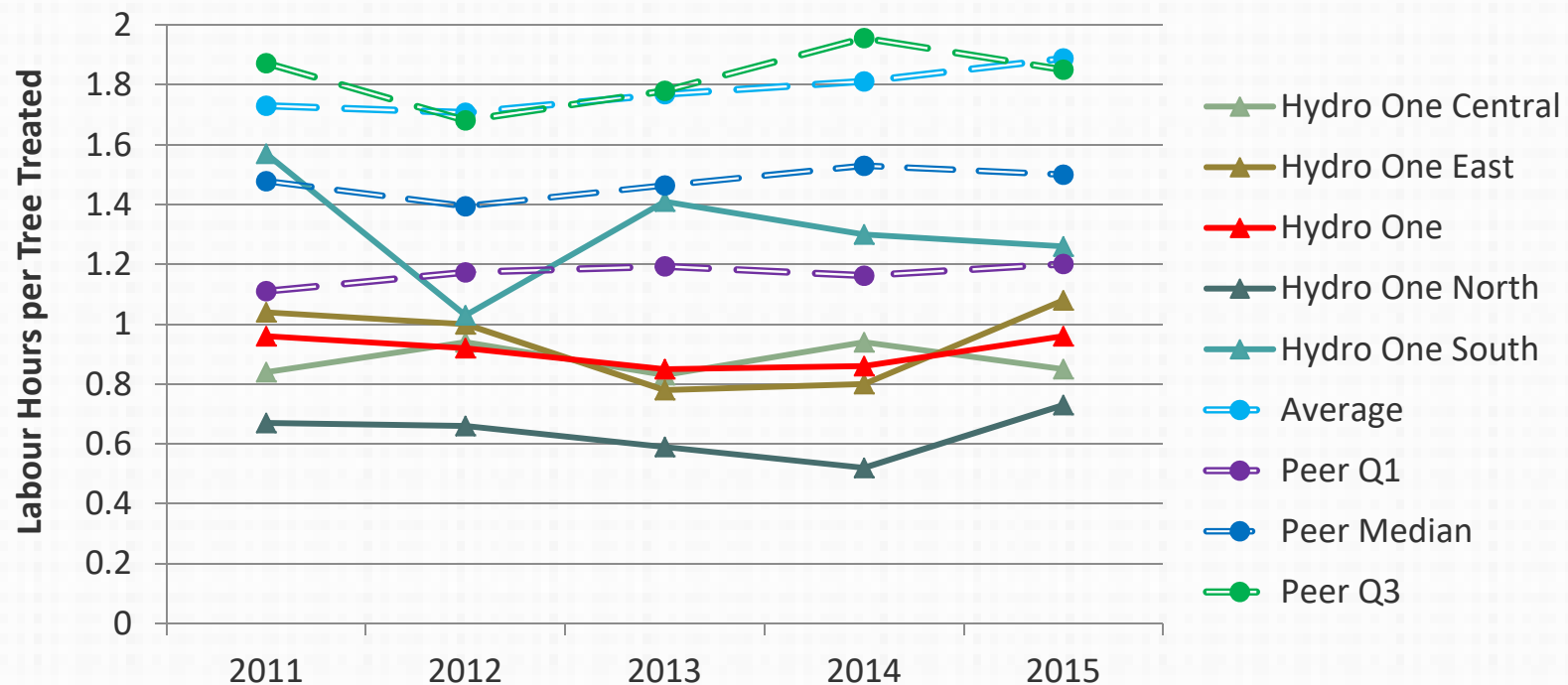
# Key Work Efficiency Findings

## Productivity

Work efficiency is best measured by labour hours per work unit, trees treated and managed kilometre

Hydro One expends fewer hours per tree treated than the peers

Labour Hours per Tree Treated for 2011-2015



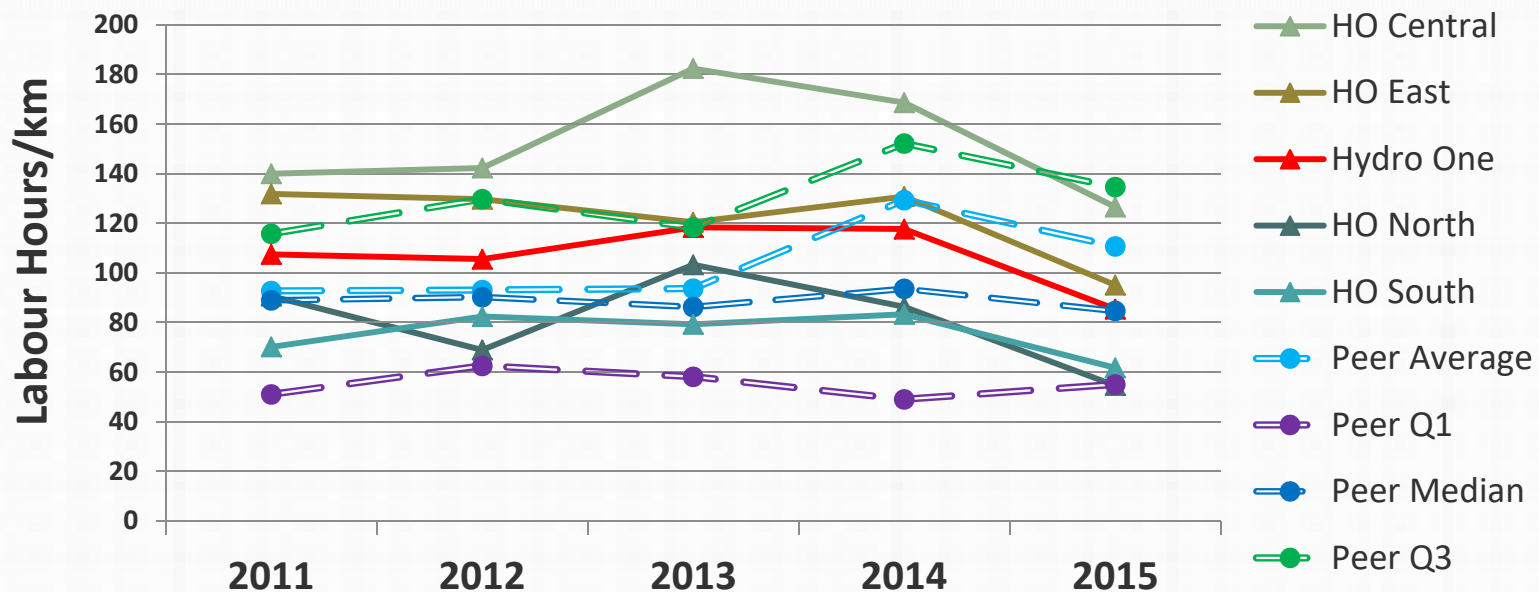
# Key Work Efficiency Findings

## Productivity

In 2015 Hydro One's progress improved over 2011

In 2015 Hydro One expended fewer hours per managed kilometre than the majority of peers

Annual Labour Hours Expended per Managed Kilometres for Routine UVM 2011-2015

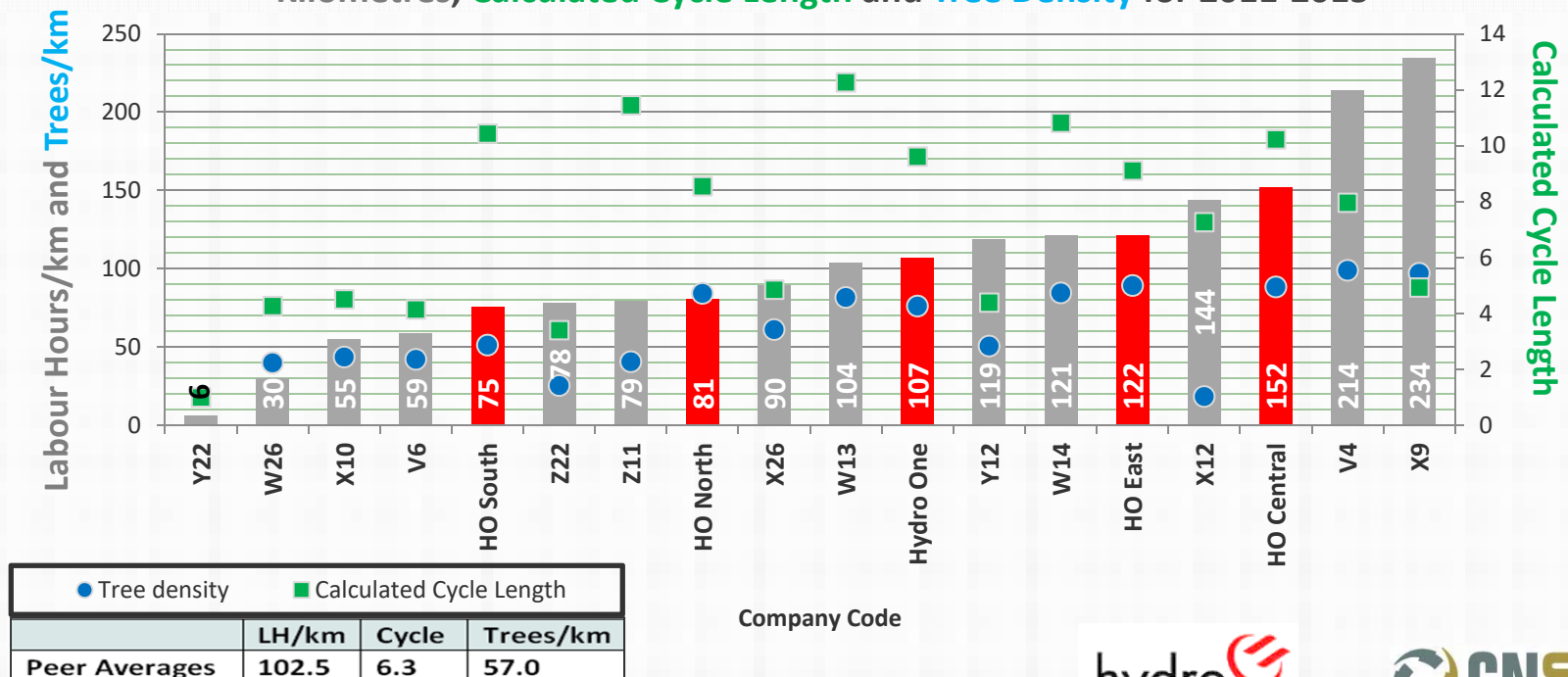


# Key Work Efficiency Findings

## Productivity

*Hydro One has maintained a level of efficiency over the past decade at or above its peers. In spite of increasing tree densities and long cycle lengths. Hydro One's tree crews have been able to stay close to the peer average of labour hours per managed kilometre for 2011-2015.*

**Average Routine Maintenance Labour Hours per Overhead Annual Managed Kilometres, Calculated Cycle Length and Tree Density for 2011-2015**



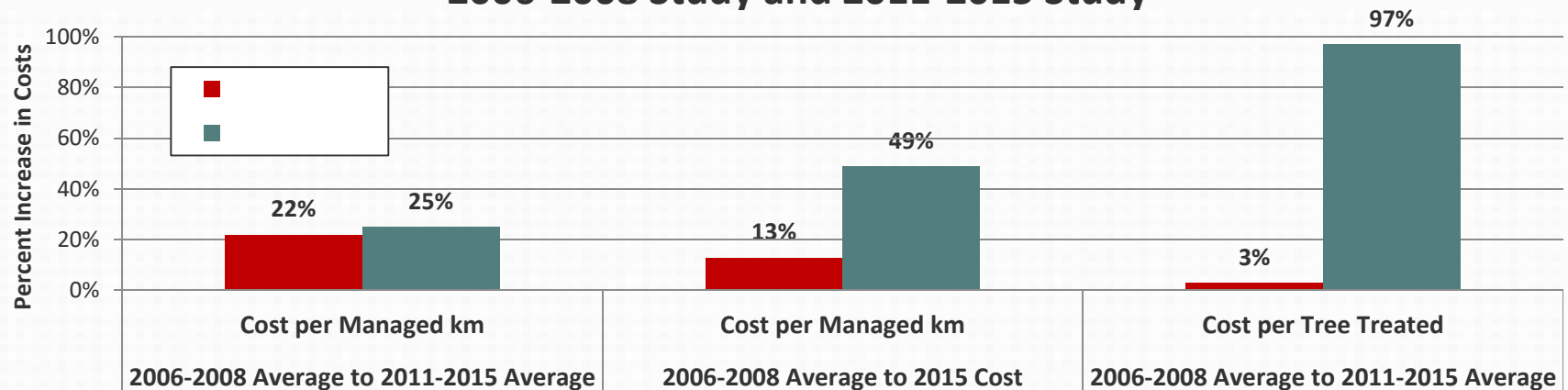


# Key Unit Cost Findings

## Managed Unit Cost

- Hydro One has the highest cost per managed km in the peer group (per managed km)
- Hydro One's managed unit costs have increased at a slower rate than the peers for 2006-2015

Change in Average Cost per Unit between  
2006-2008 Study and 2011-2015 Study



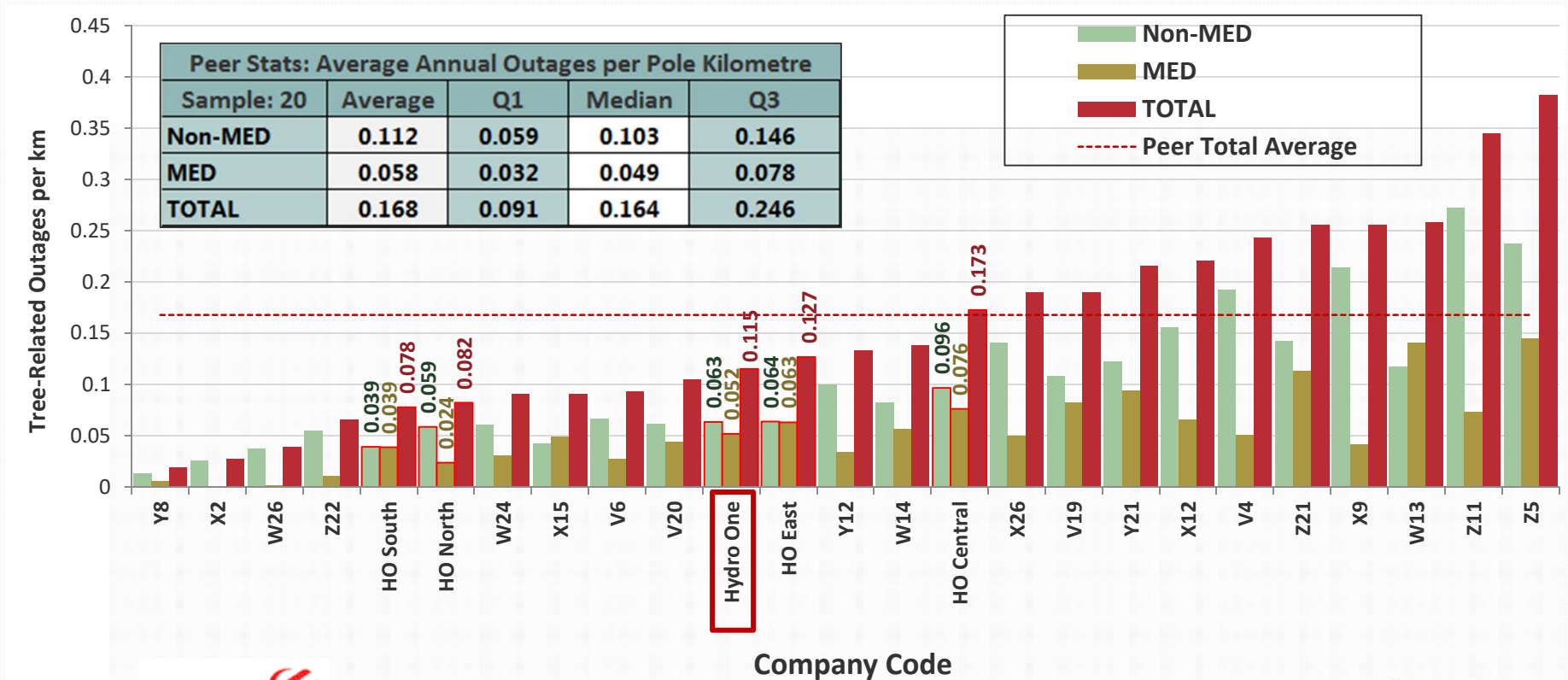


# Key Performance Indicators

## Reliability

Tree-related outages per system kilometre is the most complete reliability measure for UVM program performance

Five-Year Annual Average Tree-Related Outages per System Pole Kilometre for 2011 – 2015 for **Non-Major Event Day (Non-MED)**, **MED**, and **Total** Outages



# Key Performance Indicators

## Safety

- No fatalities, only 4 lost time incidents in three years
- Incident severity rate 7.9 (lost days/100 FTE) compared to 28.47 peer average
- Employee turnover rate 5% (peer average is 32%)
- Good correlation between incident severity rate and employee turnover in this study and this relationship is also demonstrated in other industries
- More extensive safe work practice monitoring and training than the peers

## Recommendations for Improvements

1. Continue to innovate the vegetation management with mechanization and automation
2. Develop a vegetation management outage investigation protocol and modeling program
3. Improve, consolidate, and synchronize the annual asset inspections with work planning
4. Improve equipment and personnel utilization

## Recommendations for Best Management Practices

1. Continue to clear the full width of the ROW and achieve vegetation conversion in the ROW
2. Establish and effectively communicate appropriate safety awareness for anyone who enters a ROW
3. Establish performance expectations for achieving and maintaining the appropriate space between trees and powerlines
4. Expand the tree-risk assessment program to reduce outages caused by off-ROW trees
5. Develop intervals of maintenance that are sufficiently flexible for regional differences and reliability needs
6. Cultivate positive customer involvement with UVM





# Conclusion and Q&A

- ❑ In spite of extreme challenges, Hydro One:
  - ❑ Has improved performance and work efficiency and has maintained a higher efficiency than their peers for a decade.
  - ❑ Has a significantly better reliability performance than the peers when measured as number of outages per system kilometre
  - ❑ Has a low accident severity rate, low employee turnover, and a more comprehensive safety training program than the peers
- ❑ Although contemporary reliability metrics provide some concept of performance, they are a lagging indicator and do not adequately measure the success of a UVM program.
- ❑ Additional metrics, such as recommended by this report, are needed to establish an acceptable level of risk and performance.
- ❑ The UVM program should focus on long-term improvements as well as short-term gains.

